

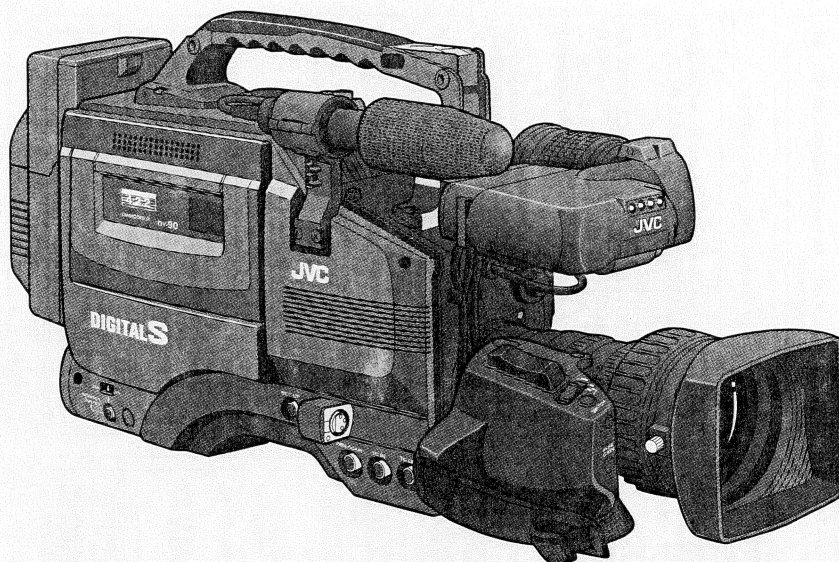
JVC[®]

DIGITAL S CAMCORDER

DY-90

DIGITAL S

INSTRUCTIONS



Illust shows the DY-90 camcorder with an optional lens, microphone, mic holder and viewfinder.

This instruction manual was revised in
correspondence with service manual of DY-90.

To maintain picture and sound quality, use the
exclusive head cleaning cassette after every
20 hours of operation.
For details on head cleaning, refer to page 7.

INTRODUCTION

CONTROLS,
INDICATORS AND
CONNECTORS

BASIC SYSTEM
CONNECTIONS AND
ADJUSTMENTS

POWER SUPPLY

PREPARATIONS

SETTING AND
ADJUSTMENTS
BEFORE SHOOTING

SHOOTING
OPERATION

PLAYBACK MODE

TIME CODE
OPERATION

SETUP MENU

FEATURES OF THE
CAMERA SECTION

OTHERS

SC96822 : U-ver.
SC96823 : E-ver.

SAFETY PRECAUTIONS

FOR USA AND CANADA



The lightning flash with arrowhead symbol, within an equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

INFORMATION FOR USA

INFORMATION

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CAUTION

CHANGES OR MODIFICATIONS NOT APPROVED BY JVC COULD VOID USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS: (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRABLE OPERATION

INFORMATION (FOR CANADA) RENSEIGNEMENT (POUR CANADA)

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

WARNING:

TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

This unit should be used with 12V DC only.

CAUTION:

To prevent electric shocks and fire hazards, do NOT use any other power source.

NOTE:

The rating plate (serial number plate) is on the top frame.

CAUTION

To prevent electric shock, do not open the cabinet. No user serviceable parts inside. Refer servicing to qualified service personnel.

AVERTISSEMENT :

POUR EVITER LES RISQUES D'INCENDIE OU D'ELECTROCUTION, NE PAS EXPOSER L'APPAREIL A L'HUMIDITE OU A LA PLUIE.

Ce magnétoscope ne doit être utilisé que sur du courant direct en 12V.

ATTENTION :

Afin d'éviter tout risque d'incendie ou d'électrocution, ne pas utiliser d'autres sources d'alimentation électrique.

REMARQUE :

La plaque d'identification (numéro de série) se trouve sur le panneau arrière de l'appareil.

WARNING ON LITHIUM BATTERY

The battery used in this device may present a fire or chemical burn hazard if mistreated. Do not recharge, disassemble, heat above 100°C (212°F) or incinerate. Replace battery with Matsushita Electric CR2032, use of another battery may present a risk of fire or explosion.

- Dispose of used battery promptly.
- Keep away from children.
- Do not disassemble and do not dispose of in fire.

For Sweden

VARNING

Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparatfabrikören. Kassera använt batteri enligt fabrikantens instruktion.

For Norway

ADVARSEL

Lithiumbatteri-Eksplosjonsfare. Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten. Brukt batteri returneres apparatleverandøren.

For Denmark

ADVARSEL

Lithiumbatteri-Eksplosjonsfare ved fejlagtig håndtering. Udsifting må kun ske med batteri af samme fabrikat og type. Lever det brugte batteri tilbage til leverandøren.

For Finland

VAROITUS

Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

Thank you for purchasing the DY-90 DIGITAL S CAMCORDER.
(These instructions are for DY-90U)

DIGITAL S

This unit is a DIGITAL S format camcorder. Video cassette tapes which are not marked DIGITAL S cannot be used with this unit.

Precautions for 4 channel audio internal editing

Use a 4 channel audio compatible Digital S editing unit (BR-D92, etc.) when performing audio insertion editing of a 4 channel audio recorded tape. When performing audio insertion editing with a Digital S editing unit which is not 4 channel audio compatible (BR-D80, BR-D85 and BR-D750), the recorded audio signals on the DA3 and DA4 channels are erased.

MAIN FEATURES

- Compact, lightweight, low-power consumption design.
- High picture quality thanks to the DIGITAL S format. The 4:2:2 component digital processing of the format ensures recording and playback with high picture quality.
- High sound quality thanks to the 4-channel PCM audio. High-quality digital audio with 16-bit, 48 kHz sampling is provided for 4 channels.
- Concentrated LCD display (with back light) The concentrated LCD panel shows the time code and CTL count, tape remaining time, remaining battery power, audio levels, VCR's setup menus, hour meter data and a variety of warning indications. It is back-lighted to facilitate viewing under low light conditions.
- Time code reader/generator The built-in time code reader/generator can be used to record SMPTE; U-ver/EBU; E-ver time code and user's bits.
- Time code input/output connectors for slave lock capability This unit can be slave-locked to an external time code generator which is connected to the time code input. The data in the built-in time code generator is output from the time code output terminal.
- 4-line audio input connectors Four lines of audio input are available including camera microphone, interview microphone and line input. Highly reliable balanced XLR connectors are provided for microphone and line input, for ensuring improved signal-to-noise ratio and enhanced sound quality.
- AEF (Automatic Edit Function) enables neat switching between scenes.
- Date/time data recording Apart from the SMPTE; U-ver/EBU; E-ver time code area, another time code area is provided for the recording of data on the date and time of the day.
- Built-in loudspeaker for audio checking The input audio can be monitored in record or EE mode and the reproduced audio can be monitored in play mode. The loudspeaker also outputs an alarm tone in case an abnormal condition occurs with the unit.
- Rec check function for quick recording review
- Scene change cueing function Enables searching of the end of the recorded section for the next recording when the recorded tape is loaded.
- LOLUX captures scenes never before possible because of low lighting conditions. In this mode the CCD chip is maximized for low light sensitivity. This Super Sensitivity is ideal for special shooting conditions with almost no lighting. Good color balance is maintained even down to 0.75 lx illumination.
- Multi-Zone Auto Iris Detection Circuit Multi-zone iris detection circuit ensures optimum iris position even in backlit conditions or when a bright subject moves in a frame. Over-under level switchable.
- Safety Zone indication In addition to center mark on/off capability, safety zone indication for the 16:9 screen format is available.
- Zebra pattern video level indication Indicated area can be selected with 70 - 80%, 85 - 95%, OVER 95% or OVER 100%.
- Full Auto Shooting (FAS) function The FAS function provides a wide range of compatibility with shooting conditions which varies as you move between indoors and outdoors or between bright and dark locations. It is not necessary to change the switch and filter positions every time you move.
- Color temperature conversion filters for "3200 K", "5600 K", "5600 K + 1/16 ND" and "3200 K + Effect (cross)".
- Colour temperature conversion filters for "3200 K", "5600 K", "5600 K + 1/4 ND" and "5600 K + 1/16 ND"
- Variable scan. Flicker bars in the display image of computer monitors are caused by the differing scan rate of the computer monitors. The Variable Scan function can minimize this effect by tuning the camera shutter speed to the precise scan rate of the display screen. The small increments range from 60.5 Hz to 1966.7 Hz (U-ver.) from 50.4 Hz to 1953.1 Hz (E-ver.).
- Set up box provided Data for the recording condition set with the menu switches on the camera section can be registered on the set up box. The data registered on the set up box can be recalled and loaded on the main unit for a quick setup.

The following symptoms will appear when the tapes recorded on other units (including DY-90) are recorded or played back on this machine.

- The transient section between scenes recorded on other units may appear disturbed.
- Digital noise appears during playback because of tracking errors.

- Not to record important materials contents for two or three minutes in the beginning of tape.
- We cannot assume the liabilities which may derive from the impossibilities of normal recording or playback in case of failure with this unit or the video cassette in use.

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OTHERS

12. OTHERS

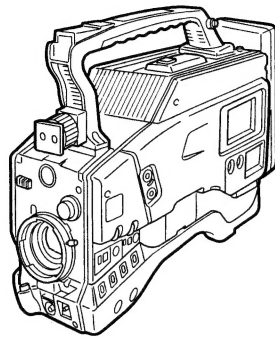
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1. INTRODUCTION

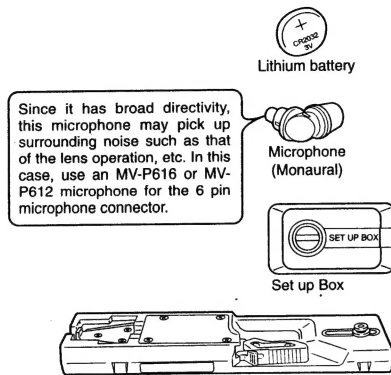
1-1 System Configuration

The standard configuration of the DY-90 is as shown below.

STANDARD CONFIGURATION



Camcorder (DY-90)



Tripod base

1-2 Precautions for Proper Use

- **Supply voltage**
Make sure that the power is between 11 V and 15 V DC. If the power voltage is too low, abnormal color and increased noise may occur. Do not exceed 15 V DC in any case, or the unit could be damaged.
- **Where there are strong electromagnetic waves or magnetism**, for example near a radio or TV transmitter, transformer, motor, etc., the picture may contain noise and the colors may be incorrect.
- **When a wireless microphone or wireless microphone tuner is used** near the camera, the tuner could pick up noise. In such a case, select another channel.
- **Avoid using or placing the unit in places;**
 - subject to extreme heat or cold;
 - with excessive dirt or dust;
 - with high humidity or moisture;
 - subject to smoke or vapor such as near a cooking stove;
 - subject to strong vibrations or on an unstable surface.
 - also do not leave the unit for long hours in a parked car under direct sunlight or near room heating equipment.
- **Protect the unit from being splashed with water** (especially when shooting in the rain).
- **Protect the unit against penetration of dust** when using it in a place subject to sandy dust.
- **Use the unit in an upright position.** If placed on its side, heat release efficiency will deteriorate, adversely affecting the tape transport.
- **Do not drop or hit it against a hard object.**
(Special care is required to avoid shocks during transportation.)
- **Remove the video cassette before transporting the unit.**
- **Do not insert an object other than a video cassette in the cassette insertion slot.** Be sure to close the cassette cover when the unit is not to be used for a long period.
- **To avoid condensation inside the unit**, do not transport it between places with a large difference in temperature.
- **Do not set the POWER switch to OFF** or remove the power cable during recording or playback. Otherwise the tape may be damaged.
- **When the unit is not in use**, be sure to set the POWER switch to OFF in order to save power consumption.
- **Cleaning the body:** Wipe body with a dry, soft cloth (such as cheesecloth). When it is extremely dirty, soak the cloth in a solution of neutral detergent, wring it out and then wipe. To prevent deformation of the body, etc. and to avoid operation hazards, do not allow volatile liquids such as benzene and thinner to touch the body, and do not wipe it with a cloth soaked in such a liquid.
If the equipment is soiled with water, oil, solvent, etc., wipe over with soft cloth or cotton first, then clean with gauze, etc. soaked in denatured alcohol.
- **The camera may be unstable in the period immediately after the power is turned on**, but this is not a malfunction.
- **Do not playback an PAL for U-ver, NTSC for E-ver recorded tape**, as this may cause noise to the audio and video signals even when the unit enters the stop mode. If this happens, remove the cassette tape so that the unit returns to its normal state.
- **Setup level (U-ver. only)**
The MONITOR OUTPUT connector of this unit outputs the video signal with setup at the factory. When the video signal without setup is requested, consult your nearest JVC authorized agent.
Only the video signal without setup is recorded on the tape.

See page 1-9 "1.8.1 Dip switch S1 on the CP board have the functions as described below".

1. INTRODUCTION

1-3 Routine and Periodical Maintenance

This unit incorporates precision mechanical parts, which will collect dirt, wear out and deteriorate as the unit is used. On the other hand, when the unit has been used for a long period, the heads, drums and tape transport mechanisms also collect dirt deposited on them. Also, dust which penetrates the inside of the VCR section especially during outdoor use will promote the wear and deterioration of mechanical parts by causing poor contact between tape and heads or failing to maintain the video and audio quality at high levels. To prevent wear and deterioration, clean the mechanical parts using a head cleaning tape as routine maintenance. But cleaning with a head cleaning tape alone is not enough for cleaning the entire tape transport mechanism. It is also recommended to apply periodical maintenance (inspection) to prevent troubles which may be caused by the sudden occurrence of failure.

As the replacement, adjustment and servicing of parts require advanced skill and equipment, please consult the person in charge of professional video equipment at your nearest JVC-authorized service agent.

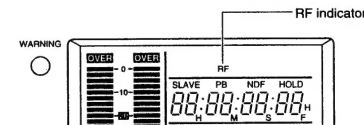
Head Cleaning

- To maintain high video and audio quality, clean the heads by using the special head cleaning tape about every 20 hours. If head cleaning is not performed periodically, a type of mosaic noise called block noise may appear in the picture or sound may be interrupted.



Block Noise

- Use the optional DCL-5 as the head cleaning tape.
- Do not use head cleaning tapes other than specified. Read the instructions of the head cleaning tape for its operating procedure and precautions.
- When dust is deposited on the video head of the VCR section, the RF indicator lights up on the display during the back-space operation in record-pause mode. At this time, the warning message "VTR WARNING (HEAD)" is displayed on the viewfinder. During recording, this indicator does not light up and the warning message on the viewfinder is not displayed.



See page 2-4 "MAINTENANCE AND INSPECTION OF MAIN PARTS".

Periodical Maintenance

Contents : Check or replace the following mechanical parts according to the running time.

Running Time	500H	1000 H	1500H	2000H
Drum ass'y (including heads)	●	●	●	●
Head cleaner	●	●	●	●
Tape guides & rollers	○	○	○	●
Fixed heads	○	○	☆	●
Belts & pinch rollers	○	●	○	●
Drive parts	○	○	☆	●

- The drum assembly (including heads) should be replaced every 500 hours. ☆: Clean and check. Replace as required.
- The maintenance contents may be variable depending on the operating environment and method. Therefore, the above data should be considered as a reference.

Time management

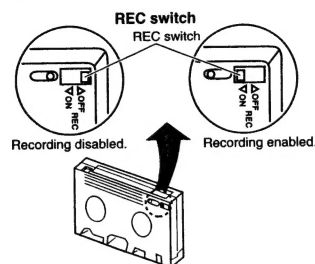
The running time of the VCR section can be confirmed with the hour meter display (which shows the drum running time). For details, see "HOUR METER DISPLAY" on page 87.

For consultations related to the maintenance programming or cost, please contact the person in charge of professional video equipment at your nearest JVC-authorized service agent.

1. INTRODUCTION

1-4 Video Cassette to be Used

- Only cassette bearing the "S" logo can be used with this unit.
- Video cassettes marked with S-VHS or VHS cannot be used with this unit. If you insert an S-VHS or a VHS cassette in the VCR, it will be ejected automatically.
- Video cassettes cannot be used upside down.
- Avoid storing a video cassette with unevenly wound tape, as this may damage the tape. Rewind it to the beginning before placing a cassette into storage.
- After a video cassette tape has been used repeatedly, it becomes unable to maintain full performance due to an increase in noise caused by dropouts, etc. Do not continue to use a dirty or damaged tape, as this will reduce the rotary head life.
- The video cassette tape marked S is provided with a REC switch for use in preventing accidental erasure.
 - Slide the REC switch to OFF to protect the required recording in the tape from being overwritten.
 - To record on the tape, slide the REC switch to ON.



1-5 Battery Pack to be Used

This unit can use any of the following battery packs.

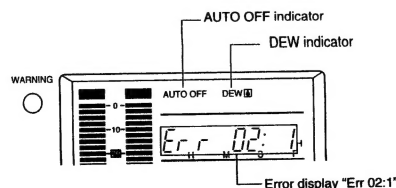
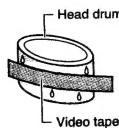
- JVC battery pack : NB-G1U
- Flat Shape Type battery pack
- Anton-Bauer battery pack : Trimpack 13/14 Series, Magnum 13/14 Series, Compact 13/14 Series, Propack 13/14 Series.

- An Anton-Bauer battery pack cannot be attached to this unit directly.
An additional battery holder is required.
- Battery holder: Anton-Bauer model QRQ27.
See page 37 for battery holder attaching method.

To display the remaining battery power accurately, set "BATT. TYPE SELECT" in setup menu Group 4 according to the type of the battery pack in use. (See page 64)

1-6 Condensation

- When the unit which has been cooled down completely in a cold place is carried to a warm place, the moisture contained in the warm air may attach to the head drum or tape guides and be cooled into water droplets. This phenomenon is referred to as condensation (dew). When this occurs in a DY-90, the head drum and tape guides are covered with droplets allowing the tape to be stuck to them, leading to tape damage.
- Condensation occurs in the following cases:
 - When the unit is suddenly moved from a cold place to a warm place.
 - When the room heater has just started or when the unit is exposed directly to cold air from the air conditioner.
 - When the unit is placed in a very humid place.
- When condensation occurs with this unit, the DEW on the display lights up, the error code "Err 02:1" appears on the counter display (see page 85).
A warning message "VTR WARNING (DEW)" is displayed on the viewfinder screen.
To assist this, leave the unit with the power ON and wait until the error code "Err 02:1" and the DEW indicator disappear from the display.



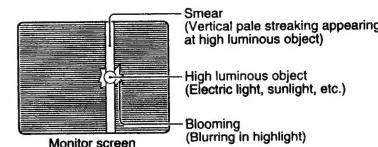
1. INTRODUCTION

1-7 Camera and Lens

CAMERA

CCD Smear and Blooming

- Due to the physical structure of the CCD in this unit it is possible to induce vertical streaking or smear when shooting an extremely bright light source.
- Another effect is the expansion of light around a bright light or object called Blooming.
Just as you protect your image against lens flare (internal lens reflections): please be careful when shooting a bright light source.



Gain, Noise

- Higher levels of output gain result in a decrease in the signal to noise ratio, possibly resulting in a noisy picture.

Moire or Aliasing

- Shooting stripes or fine patterns may cause a jagged effect or a banding in fine mesh patterns.
Try repositioning the lens zoom to change the frequency of the detail information and eliminate the distortions.

High Temperatures

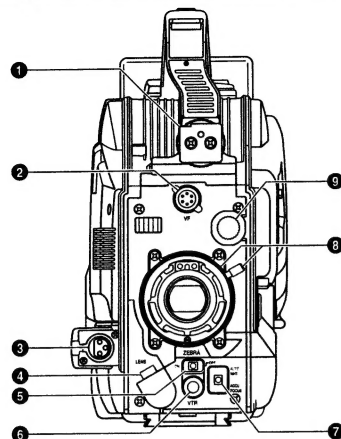
- High temperatures can cause CCD sensor pixels to malfunction with the effect of white dots in the image. This condition could damage the CCD, and certainly raises the "fixed pattern" noise level which CCDs have, thus giving a noisy picture.

LENS

- The camera lens should be protected externally with a Clear or UV filter against accidental scratching, touching or dirt. The external lens cap should be used whenever possible.
- When the lens is changed, take special care to avoid contaminating the inner lens surface and camera gate/optical block area with moisture or dust.
- Do not expose the lens or viewfinder to strong sunlight or place in a strong light source.
 - Exposure of the lens or viewfinder to strong sunlight or other strong light sources will cause eye injuries.
 - Continued exposure of the lens or viewfinder to sunlight will damage the internal condensing lens, resulting in malfunction and possible fire.

2. CONTROLS, INDICATORS AND CONNECTORS

2-1 Front Section (U ver.)



1 Viewfinder mount base, sliding securing ring
Mount the VF-P116 or VF P115 viewfinder (optional) on the base and secure it using the sliding securing ring. See "Attaching the Viewfinder" on page 31.

2 [VF] Viewfinder connector
Connect to the cable from viewfinder.

3 [DA2 IN (MIC IN + 48 V)] DA2 (Microphone) input connector
This balanced XLR three connector is for microphone level only. A 48 V DC is supplied as the power supply for the microphone (Use only phantom microphone). Connect the JVC MV-P615 or other microphone.
The audio signal from this connector is recorded on DA2 of the PCM audio channel. It is also recorded on the linear track of the tape for audio search.
When using a microphone other than a Phantom microphone, consult a JVC authorized service agent.



Pin No.	Function
1	GND
2	HOT
3	COLD

See "Attaching the Optional Microphone" on page 33.

4 [LENS] Lens control connector
Connect 12-pin lens control cable from lens.
Lens connector function

Pin No.	Function	Pin No.	Function
1	RET switch	7	IRIS position
2	VCR trigger	8	IRIS A/R INPUT
3	GND	9	EXTENDER position
4	Lens AUTO/MANU control	10	ZOOM position
5	IRIS control	11	—
6	+12V DC	12	—

5 [ZEBRA] Switch

When this switch is ON, a zebra pattern is displayed with a brightness corresponding to 70% to 80% video levels on the viewfinder screen. This pattern can be used as a reference for manual adjustment of the lens iris.
When adjusting the iris manually, adjust it so that the zebra patterns are displayed in the section which you want to stress in the object.
• The default value is 70% - 80%. The luminance level can be changed with the ZEBRA setting in the Advanced Menu screen.
See "ZEBRA item" on page 70.

6 [VTR] VTR trigger button (record start/stop button)
With the VCR set in record pause mode, record start/stop can be effected with this button.
(It is interlocked with the lens and the VTR trigger button on the side panel.)

7 [AUTO WHT/ACCU FOCUS] switch

AUTO WHITE :
First position a white object to occupy 80% of the center of the image.
Setting this switch to the upper position ("AUTO WHT.") will provide automatic adjustment for white balance. It is not activated in preset, full auto shooting, full-time auto white balance and color bar modes.
See "White Balance Adjustment" on page 44.
ACCU-FOCUS :
When this switch is set to "ACCU FOCUS" in the lower position, the lens iris will be forced to open for approximately ten seconds.
The object depth can be reduced and the lens focusing can be adjusted more accurately.

CAUTION :

As the automatic shutter is activated here, flicker may appear on the screen depending on the lighting conditions (such as a fluorescent lamp, etc.)
Operation is not possible in the LoLux mode.

8 Lens mounting ring/Lens lock lever

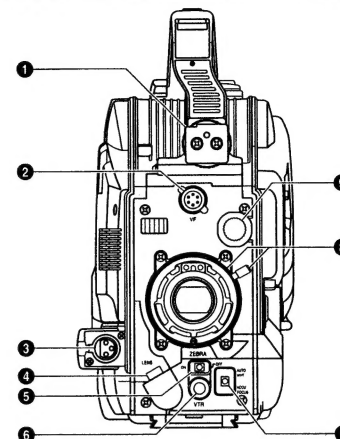
Hold the lens and use the knob to twist the ring anticlockwise to release lens.
To mount lens make sure the lens guide pin fits well, and then twist the ring clockwise until firm.
See "Attaching the Zoom Lens (Optional)" on page 31

9 [FILTER] Color temperature conversion filter control knob

This knob changes the internal filter of color temperature.
See "Filter" on page 41.

2. CONTROLS, INDICATORS AND CONNECTORS

2-1 Front Section (E-ver.)



1 Viewfinder mount base, sliding securing ring
Mount the VF-P116 or VF P115 viewfinder (optional) on the base and secure it using the sliding securing ring. See "Attaching the Viewfinder" on page 31.

2 [VF] Viewfinder connector
Connect to the cable from viewfinder.

3 [MIC 2 IN + 48 V] Microphone 2 input connector
This balanced XLR three connector is for microphone level only.
A 48 V DC is supplied as the power supply for the microphone (Use only phantom microphone). Connect the JVC MV-P615 or other microphone.
When using a microphone with this connector, refer to 5 [MIC1/MIC2] SELECT switch on page 15 and set the switch to MIC2.



Pin No.	Function
1	GND
2	HOT
3	COLD

See "Attaching the Optional Microphone" on page 33.

4 [LENS] Lens control connector

Connect 12-pin lens control cable from lens.
Lens connector function

Pin No.	Function	Pin No.	Function
1	RET switch	7	IRIS position
2	VCR trigger	8	IRIS A/R INPUT
3	GND	9	EXTENDER position
4	Lens AUTO/MANU control	10	ZOOM position
5	IRIS control	11	—
6	+12V DC	12	—

5 [ZEBRA] Switch

When this switch is ON, a zebra pattern is displayed with a brightness corresponding to 70% to 80% video levels on the viewfinder screen. This pattern can be used as a reference for manual adjustment of the lens iris.
When adjusting the iris manually, adjust it so that the zebra patterns are displayed in the section which you want to stress in the object.
• The default value is 70% - 80%. The luminance level can be changed with the ZEBRA setting in the Advanced Menu screen.
See "ZEBRA item" on page 70.

6 [VTR] VTR trigger button (record start/stop button)
With the VCR set in record pause mode, record start/stop can be effected with this button.
(It is interlocked with the lens and the VTR trigger button on the side panel.)

7 [AUTO WHT/ACCU FOCUS] switch

AUTO WHITE :
First position a white object to occupy 80% of the center of the image.
Setting this switch to the upper position ("AUTO WHT.") will provide automatic adjustment for white balance. It is not activated in preset, full auto shooting, full-time auto white balance and colour bar modes.
See "White Balance Adjustment" on page 43.
ACCU-FOCUS :
When this switch is set to "ACCU FOCUS" in the lower position, the lens iris will be forced to open for approximately ten seconds.
The object depth can be reduced and the lens focusing can be adjusted more accurately.

CAUTION :

As the automatic shutter is activated here, flicker may appear on the screen depending on the lighting conditions (such as a fluorescent lamp, etc.)
Operation is not possible in the LoLux mode.

8 Lens mounting ring/Lens lock lever

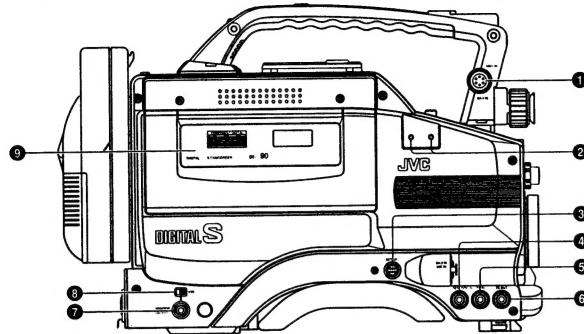
Hold the lens and use the knob to twist the ring anticlockwise to release lens.
To mount lens make sure the lens guide pin fits well, and then twist the ring clockwise until firm.
See "Attaching the Zoom Lens (Optional)" on page 31

9 [FILTER] Colour temperature conversion filter control knob

This knob changes the internal filter of colour temperature.
See "Filter" on page 40.

2. CONTROLS, INDICATORS AND CONNECTORS

2-2 Left Side Section (Cassette Side) (U-ver.)



1 [DA4 IN (MIC 1 IN)] DA4 (Microphone 1) Input connector (6-pin)

Connect the provided microphone. With the mic holder (optional), the following microphone models can be used.

- MV-P616 (mono)
- MV-P612 (stereo/mono)
- The audio signal from this connector is recorded on DA4 of the PCM audio channel.
- * It is not recorded on the linear track of the tape for audio search.
- * When using a stereo microphone, the audio signal is only recorded on the L channel.

Pin No.	Function	Pin No.	Function
A	—	D	L (Hot)
B	9 V DC	E	L (GND)
C	GND	F	—

2 Mic holder mounting screw holes

The mic holder KA-A90 (Optional) can be mounted here.

3 [SET UP] connector

Connect the provided set up box to this connector. The camera's menu data set with the 2 FILE switch A, B or OFF on page 14 can be read out onto the set up box. Also the camera's menu data stored in the set up box can be recalled and written onto the FILE switch A, B or OFF.

- For readout from and writing on the set up box, see page 78.

4 [GEN LOCK IN] connector (BNC)

External reference composite video or black burst video input. This unit cannot be genlocked with the VCR playback signal. See "Connection with a switcher" on page 80.

Note :

When the power is switched ON while external sync signal is input, the screen moves in a vertical direction for a few seconds. This is not a malfunction.

5 [TC IN] connector (BNC)

Input connector for the SMPTE-standard LTC signal. The built-in time code generator can be slave-locked with the input time codes. For the slave lock of time code, see page 58.

6 [TC OUT] connector (BNC)

Output connector for the LTC signal from the built-in time code generator. The time code recorded on the tape is not output in play mode.

7 [MONITOR OUTPUT] connector (BNC)

- Composite video signal output connector. Outputs the video signal selected by the 3 [CAM/VTR] switch.
- The signal with setup will be output.
- * Setup menu items for camera section, VCR section, time code or date/time data are not output.

8 [CAM/VTR] Monitor output CAM/VTR switch

This selects the video signal to output to the MONITOR OUTPUT connector or viewfinder.

CAM : Regardless of which mode, the EE image from the camera video signal is output.

VTR : Playback image is output during the playback mode. An EE image is output during other modes than the Play Mode.

* The backspace function during the Record-Pause Mode and the recording check function are also carried out on the playback mode.

Regardless of the switch setting, playback sound is output during the playback mode and EE sound is output during other modes.

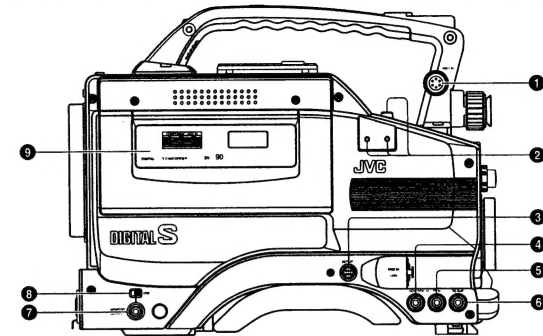
9 Cassette cover

When the DY-90 is in POWER ON mode, pressing the EJECT button on the top of the VCR section opens this cover so that a cassette tape can be inserted or removed from the unit. The cover can be locked automatically by pushing and closing it.

To prevent penetration of foreign objects in the unit, do not leave the unit with the cassette cover open.

2. CONTROLS, INDICATORS AND CONNECTORS

2-2 Left Side Section (Cassette Side) (E-ver.)



1 [MIC 1 IN] Microphone 1 Input connector (6-pin)

Connect the provided microphone. With the mic holder (optional), the following microphone models can be used.

- MV-P616 (mono)
- MV-P612 (stereo)
- When using a microphone with this connector, refer to 3[MIC1/MIC2] SELECT switch and set the switch to MIC1. See page 15.
- Set the [FRONT MIC1 SELECT] on the SETUP MENU according to the microphone type (monaural or stereo) to be connected. See page 64.

Pin No.	Function	Pin No.	Function
A	R (Hot)	D	L (Hot)
B	9 V DC	E	L (GND)
C	GND	F	R (GND)

To find out to which channel of the tape the audio signal from MIC1 or MIC2 connectors is recorded, see page 64.

2 Mic holder mounting screw holes

The mic holder KA-A90 (Optional) can be mounted here.

3 [SET UP] connector

Connect the provided set up box to this connector. The camera's menu data set with the 2 FILE switch A or B on page 14 can be read out onto the set up box. Also the camera's menu data stored in the set up box can be recalled and written onto the FILE switch A or B.

- For readout from and writing on the set up box, see page 78.

4 [GEN LOCK IN] connector (BNC)

External reference composite video or black burst video input. This unit cannot be genlocked with the VCR playback signal. See "Connection with a switcher" on page 80.

Note :

When the power is switched ON while external sync signal is input, the screen moves in a vertical direction for a few seconds. This is not a malfunction.

5 [TC IN] connector (BNC)

Input connector for the EBU-standard LTC signal. The built-in time code generator can be slave-locked with the input time codes.

For the slave lock of time code, see page 58.

6 [TC OUT] connector (BNC)

Output connector for the LTC signal from the built-in time code generator. The time code recorded on the tape is not output in play mode.

7 [MONITOR OUTPUT] connector (BNC)

- Composite video signal output connector. Outputs the video signal selected by the 3 [CAM/VTR] switch.
- * Setup menu items for camera section, VCR section, time code or date/time data are not output.

Note :

Make sure that the monitor is terminated with 75 Ω before connecting the MONITOR OUTPUT connector. If it is not terminated with 75 Ω the video signal will not output when the power is on because of the power saving features equipped with this unit.

8 [CAM/VTR] Monitor output CAM/VTR switch

This selects the video signal to output to the MONITOR OUTPUT connector or viewfinder.

CAM : Regardless of which mode, the EE image from the camera video signal is output.

VTR : Playback image is output during the playback mode. An EE image is output during other modes than the Play Mode.

* The backspace function during the Record-Pause Mode and the recording check function are also carried out on the playback mode.

Regardless of the switch setting, playback sound is output during the playback mode and EE sound is output during other modes.

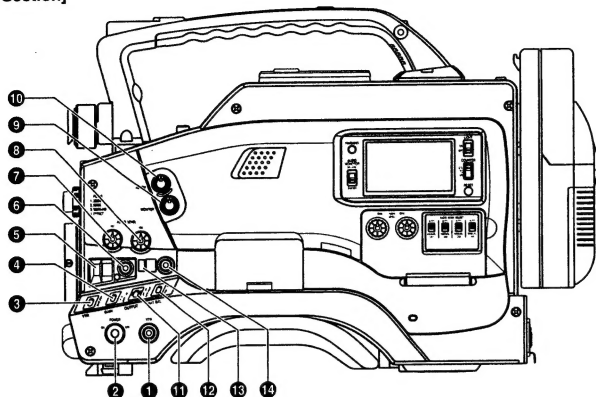
9 Cassette cover

When the DY-90 is in POWER ON mode, pressing the EJECT button on the top of the VCR section opens this cover so that a cassette tape can be inserted or removed from the unit. The cover can be locked automatically by pushing and closing it.

To prevent penetration of foreign objects in the unit, do not leave the unit with the cassette cover open.

2-3 Right Side Section (U-ver.)

[Camera Setting Section]



1 [VTR] VTR trigger button (Recording Start/Stop)
With the VCR set in record pause mode, record start/stop can be effected with this button.
(It is interlocked with the lens and the VTR trigger button on the front sections.)

2 [POWER] switch
Turn the power ON and OFF with this switch.
• With this switch set to ON, the DY-90 status differs depending on the setting of the 4 VTR (SAVE/STBY) switch.

3 [VTR] switch
Select the DY-90 status when the power is turned ON with this switch.
SAVE : Drum rotation stops and the DY-90 enters the tape protection mode. When a recordable cassette tape is loaded, pressing the [VTR] button enters the record mode. However in this case, recording will start after a short interval.
STBY : When a recordable cassette tape is loaded, the DY-90 enters the record-pause mode and the drum continues to rotate. In this mode, when the [VTR] button is pressed, the DY-90 immediately enters the record mode.
• The mode selected by this switch is displayed on the status screen in the viewfinder.

4 [GAIN] switch
Electronically boosts the light sensitivity when there is insufficient illumination on the subject. The boosting level differs depending on the switch position as follows:
H : 18 dB (boosted to approximately 8 times the original)
M : 9 dB (boosted to approximately 3 times the original)
L : 0 dB (no boosting is applied)
• The boosting level for each switch position can be changed with the advanced menu screen. (See page 69.)
The more the boosting level is increased, the more the resulting image will be noisy.

5 [AUTO IRIS] Auto iris level switch
This switch selects the automatic iris adjustment reference value according to the condition in which the camera is used.
BACK. L : Under back light (Open the iris about 1 step from the standard level.)
NORMAL : Normal condition
SPOT. L : Under spotlight (Close the iris about 1 step from the standard level.)
See page 77.

6 [FULL AUTO] Full auto shooting ON/OFF button and indicator
• This momentary switch turns this function on and off, with a indicator light.
• Full auto shooting combines the auto iris, auto level control and full auto white (FAW) to automatically adjust the video signal level and the white balance to their optimum levels.
• The iris is placed in automatic even if the iris mode switch of the lens is in manual.
• The gain will vary continuously to the maximum of +18 dB. The shutter speed will vary continuously to the minimum of 1/200 of a second.
See [Full Auto Shooting (FAS) function] on page 77.

2-3 Right Side Section (Cont'd) (U-ver.)

7 [DA1 AUDIO LEVEL] Control
Adjusts the audio recording level of the [DA1 IN] connector on the rear panel.
This adjustment is available only when the 8 [DA1 AUDIO MODE SELECT] switch on page 15 is set to MANUAL.

8 [DA2 AUDIO LEVEL] Control
Adjusts the audio recording level of the 9 [DA2 IN (MIC IN)] connector on the front panel.
This adjustment is available only when the [DA2 AUDIO MODE SELECT] switch on page 15 is set to MANUAL.

9 [MONITOR] Audio monitor control
Adjusts the volume of the monitoring loudspeaker and earphone. The audio is muted when this control is set to the minimum position.

10 [ALARM] control
Turn to control the volume of the alarm tone which is output from the monitoring loudspeaker or earphone in case of a warning or other abnormal condition occurring with the DY-90.
Turn this control anticlockwise to reduce the volume.
Setting this control to the minimum position mutes the alarm tone.

11 [OUTPUT] Color bar/Camera/Auto knee switch
This switch is used to select the output signal. When the video signal from the shooting camera is selected, the auto knee function is available.
BARS : Outputs the color bar signal. In this mode, the auto knee function is not available. Set to this position when adjusting the video monitor or when recording the color bar signal.

CAM. AUTO KNEE OFF :
Outputs the video signal from the shooting camera. In this mode, the auto knee function is not available.

CAM. AUTO KNEE ON :
Outputs the video signal from the shooting camera. In this mode, the auto knee function is available.

AUTO KNEE function
When shooting a foreground object with a high-brightness background, if the brightness level is set for a foreground human being, etc., the background image will be blurred with white. In such a case, when the auto knee function is used, a clearer background is obtained.
It is effective especially in the following cases:

- When shooting a human being in the shade on a fine day
- When shooting a high-contrast scene

Note :
If a fast moving high-brightness section like a car in sunlight is shot, the auto knee function may change the brightness of the entire image along with the motion of the object. In this case, set the auto knee function to OFF.

12 [WHT.BAL] White balance switch
There are three white balance modes possible with this switch.
A : If white balance is performed with the switch in this position it will be memorised into A.
B : If white balance is performed with the switch in this position it will be memorised into B.
PRST (PRESET) : A non-erasable white balance setting to 3200K.
An emergency setting for outdoors with a 5600K or 5600K+ND filter turret setting.
• FAW (Full-time Auto White) mode can be set to A, B or PRESET with the ADVANCED MENU (see page 69).
In the FAW mode, video color temperatures are constantly sampled for automatic adjustment to a proper white balance.

13 [BLACK] Black stretch/black compression switch
Switches the gain for the dark section of the image. Set to an appropriate position depending on the video signal to be shot.

BLACK STRETCH :
By stretching the signal only for the dark section, contrast in the dark portion of the image is enhanced.

NORMAL :
Standard mode.

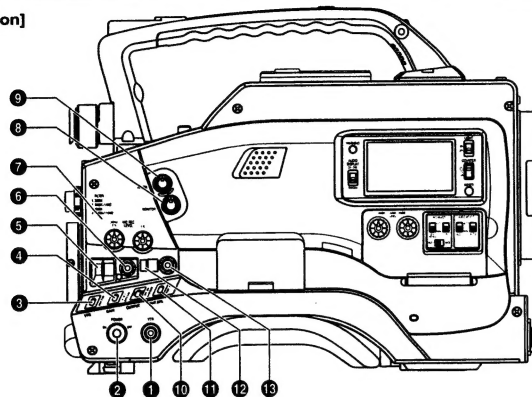
BLACK COMPRESS :
When an entire image is relatively light and the contrast is low, the gain of the dark section is compressed to increase the contrast.

14 [LOLUX] LOLUX on/off button
This button toggles the LOLUX mode on and off.
• LOLUX gain gives extremely low light level sensitivity for special applications. This will result in an increase of 33 dB in the LOLUX mode.
• LOLUX operation takes priority over normal gain operation. If the unit is placed in the LOLUX mode when it is in full auto shooting mode, the auto level control (ALC) (one of the full auto shooting functions) will be made inactive, so that the LOLUX mode is given preference (FAW still remains active).

2. CONTROLS, INDICATORS AND CONNECTORS

2-3 Right Side Section (E-ver.)

[Camera Setting Section]



1 [VTR] VTR trigger button (Recording Start/Stop)

With the VCR set in record pause mode, record start/stop can be effected with this button.
(It is interlocked with the lens and the VTR trigger button on the front sections.)

2 [POWER] switch

Turn the power ON and OFF with this switch.
• With this switch set to ON, the DY-90 status differs depending on the setting of the 3 [VTR] (SAVE/STBY) switch.

3 [VTR] switch

Select the DY-90 status when the power is turned ON with this switch.

SAVE : Drum rotation stops and the DY-90 enters the tape protection mode. When a recordable cassette tape is loaded, pressing the [VTR] button enters the record mode. However in this case, recording will start after a short interval.

STBY : When a recordable cassette tape is loaded, the DY-90 enters the record-pause mode and the drum continues to rotate. In this mode, when the [VTR] button is pressed, the DY-90 immediately enters the record mode.

• The mode selected by this switch is displayed on the status screen in the viewfinder.

4 [GAIN] switch

Electronically boosts the light sensitivity when there is insufficient illumination on the subject. The boosting level differs depending on the switch position as follows:

H : 18 dB (boosted to approximately 8 times the original)

M : 9 dB (boosted to approximately 3 times the original)

L : 0 dB (no boosting is applied)

• The boosting level for each switch position can be changed with the advanced menu screen. (See page 69.)

The more the boosting level is increased, the more the resulting image will be noisy.

5 [AUTO IRIS] Auto iris level switch

This switch selects the automatic iris adjustment reference value according to the condition in which the camera is used.

BACK. L : Under back light (Open the iris about 1 step from the standard level.)

NORMAL : Normal condition

SPOT. L : Under spotlight (Close the iris about 1 step from the standard level.)

See page 77.

6 [FULL AUTO] Full auto shooting ON/OFF button and indicator

- This momentary switch turns this function on and off, with a indicator light.
- Full auto shooting combines the auto iris, auto level control and full auto white (FAW) to automatically adjust the video signal level and the white balance to their optimum levels.
- The iris is placed in automatic even if the iris mode switch of the lens is in manual.
- The gain will vary continuously to the maximum of +18 dB. The shutter speed will vary continuously to the minimum of 1/200 of a second.

See [Full Auto Shooting (FAS) function] on page 77.

2. CONTROLS, INDICATORS AND CONNECTORS

2-3 Right Side Section (Cont'd) (E-ver.)

7 [MIC REC LEVEL] control

Adjust the recording level of the camera's microphone (MIC1 and MIC2) with this control.
This control is valid only when the [MIC SELECT] switch is set to "MANUAL".

- (Mono) 2/1L control

Adjusts the recording level of the microphones:

- Microphone of MIC 2 connector.
- Monaural microphone of MIC 1 connector
- Stereo microphone L channel of MIC 1 connector.

- 1R control

Adjusts the recording level of stereo microphone R channel of MIC1.

8 [MONITOR] Audio monitor control

Adjusts the volume of the monitoring loudspeaker and earphone. The audio is muted when this control is set to the minimum position.

9 [ALARM] control

Turn to control the volume of the alarm tone which is output from the monitoring loudspeaker or earphone in case of a warning or other abnormal condition occurring with the DY-90. Turn this control anticlockwise to reduce the volume. Setting this control to the minimum position mutes the alarm tone.

10 [OUTPUT] Colour bar/Camera/Auto knee switch

This switch is used to select the output signal. When the video signal from the shooting camera is selected, the auto knee function is available.

BARS : Outputs the colour bar signal. In this mode, the auto knee function is not available. Set to this position when adjusting the video monitor or when recording the colour bar signal.

CAM. AUTO KNEE OFF :

Outputs the video signal from the shooting camera. In this mode, the auto knee function is not available.

CAM. AUTO KNEE ON :

Outputs the video signal from the shooting camera. In this mode, the auto knee function is available.

AUTO KNEE function

When shooting a foreground object with a high-brightness background, if the brightness level is set for a foreground human being, etc., the background image will be blurred with white. In such a case, when the auto knee function is used, a clearer background is obtained.

It is effective especially in the following cases:

- When shooting a human being in the shade on a fine day
- When shooting a high-contrast scene

Note :

If a fast moving high-brightness section like a car in sunlight is shot, the auto knee function may change the brightness of the entire image along with the motion of the object. In this case, set the auto knee function to OFF.

11 [WHT.BAL] White balance switch

There are three white balance modes possible with this switch.

A : If white balance is performed with the switch in this position it will be memorised into A.

B : If white balance is performed with the switch in this position it will be memorised into B.

PRST (PRESET) : A non-erasable white balance setting to 3200K. An emergency setting for outdoors with a 5600K or 5600K+ND filter turret setting.

• FAW (Full-time Auto White) mode can be set to A, B or PRE-SET with the ADVANCED MENU (see page 69). In the FAW mode, video colour temperatures are constantly sampled for automatic adjustment to a proper white balance.

12 [BLACK] Black stretch/black compression switch

Switches the gain for the dark section of the image. Set to an appropriate position depending on the video signal to be shot.

BLACK STRETCH :

By stretching the signal only for the dark section, contrast in the dark portion of the image is enhanced.

NORMAL :

Standard mode.

BLACK COMPRESS :

When an entire image is relatively light and the contrast is low, the gain of the dark section is compressed to increase the contrast.

13 [LOLUX] LOLUX on/off button

This button toggles the LOLUX mode on and off.

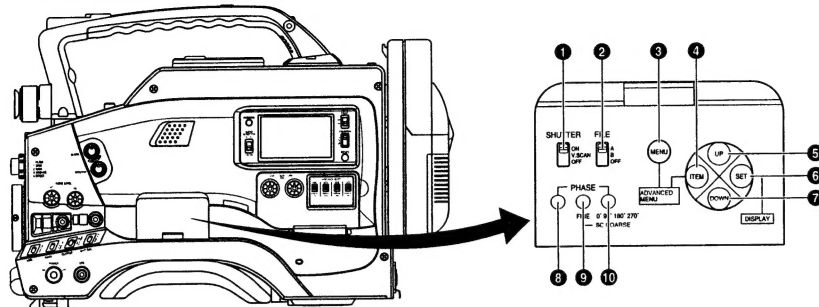
• LOLUX gain gives extremely low light level sensitivity for special applications. This will result in an increase of 33 dB in the LOLUX mode.

• LOLUX operation takes priority over normal gain operation. If the unit is placed in the LOLUX mode when it is in full auto shooting mode, the auto level control (ALC) (one of the full auto shooting functions) will be made inactive, so that the LOLUX mode is given preference (FAW still remains active).

2. CONTROLS, INDICATORS AND CONNECTORS

2-3 Right Side Section (Cont'd)

[Setup/Mode Setting Section]



1 [SHUTTER] Shutter switch

ON : This mode allows setting of different shutter speeds.
To change shutter speed push the UP 5 or DOWN 7 buttons.

V.SCAN : This mode helps adjust the shutter speed to match the scan rate of computer monitor.
Place the switch down in the V.SCAN position and then use the UP or DOWN buttons to adjust the speed.

OFF : This mode corresponds to the standard 1/60.
• The shutter speed is displayed in the viewfinder.
(See page 29.)

■ WHEN TO USE

A shutter speed of 1/50th second is too slow to prevent blurring from normal actions when a subject is moving.
This gives a smooth and natural effect when watching motion normally, but in certain applications the video is to be displayed in slow motion or as a freeze. The blurring in this case reduces the possible sharpness of the image.
As one increases the shutter speed the amount of light collected is less and less, so consideration should be given to the effects of opening the iris and increasing gain.
Opening the iris reduces depth of field and causes foreground and background objects to go out of focus. This is a useful artistic technique.

2 [FILE] File switch

This switch registers the set values at the MENU screen for camera section and reads the registered FILE.

- A** : Register to the FILE A. (in registration)
Shooting can be carried out with the set values registered to the FILE A. (in reading)
- B** : Register to the FILE B. (in registration)
Shooting can be carried out with the set values registered to the FILE B. (in reading)
- OFF** : Register to the FILE OFF. (in registration)
Shooting can be carried out with the set values registered to the FILE OFF. (in reading)

The items in the ADVANCED MENU require the registration operation. (Switch position: During A or B)
See page 68.

3 [MENU] button

4 [ITEM] button

5 [UP] button

6 [SET/DISPLAY] button

When this button is pressed in the normal mode screen, the viewfinder display mode is changed. Each time this button is pressed, the viewfinder display is changed in the order Status 0, Status 1, Status 2 and then returned to Status 0.
For details on "Status Screen", see page 25.

7 [DOWN] button

The above buttons 3 to 7 are used when setting the Setup Menu items for the camera section.
The menu screen is displayed in the viewfinder.
See page 65.

8 [PHASE H] Horizontal phase control

Use this control to adjust the H sync phase while the genlock signal is input.

9 [PHASE SC FINE] Color sub-carrier phase control

Use this control to fine-adjust the SC phase while the genlock signal is input.

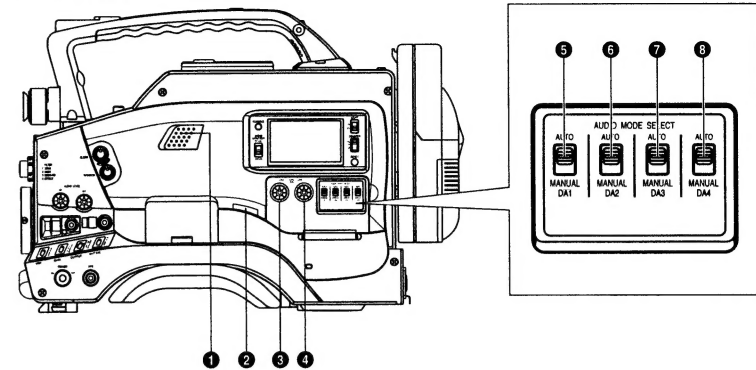
10 [PHASE SC COARSE] Color sub-carrier phase coarse adjustment control

Use this control to coarse-adjust the SC phase while the genlock signal is input.
The SC phase will toggle between 0°, 90°, 180° and 270°. See "Connection with a switcher" on page 80 for 3 through 10.

2. CONTROLS, INDICATORS AND CONNECTORS

2-3 Right Side Section (Cont'd) (U-ver.)

[Audio Setting Section]



1 Monitoring loudspeaker

- Enables EE monitoring of the input audio signal during recording, in the record-pause mode or in the stop mode.
- Outputs the playback sound in the playback mode.
- The PCM audio channels to be output can be selected using the 2 AUDIO MONITOR switch on page 16.
- The loudspeaker volume can be adjusted with the AUDIO MONITOR control.
The audio from the loudspeaker is defeated when an ear-phone is plugged into the EARPHONE jack. The warning alarm tones are also output through this loudspeaker.
For details, see pages 81 and 82.

2 Lithium Battery Installation Case

Installs a lithium battery in this case. The battery is used for the backup of the time code and the date/time data. The DY-90 is delivered without the battery installed. Install the lithium battery provided (CR2032). See page 34 for information about how to install it.

3 [DA3 AUDIO LEVEL] control

Adjusts the audio recording level of the [DA3 IN] connector on the rear panel.
The volume can be controlled when 7 [DA3 AUDIO MODE SELECT] switch is set to MANUAL.

4 [DA4 AUDIO LEVEL] control

Adjusts the audio recording level of the [DA4 (MIC1 IN)] connector on the left side section.
The volume can be controlled when 8 [DA4 AUDIO MODE SELECT] switch is set to MANUAL.

5 [DA1 AUDIO MODE SELECT] switch

Selects the audio recording level adjusting method for the [DA1 IN] connector on the rear panel.

AUTO : The audio recording level is held at the reference level even when sounds greater than the reference input level are input.
The recording level does not increase when the input level is low.

MANUAL : The recording level can be adjusted with 7 DA1 AUDIO LEVEL control on page 13.

6 [DA2 AUDIO MODE SELECT] switch

Selects the audio recording level adjusting method for the [DA2 IN (MIC IN)] connector on the front section.

AUTO : The audio recording level is held at the reference level even when sounds greater than the reference input level are input.
The recording level does not increase when the input level is low.

MANUAL : The recording level can be adjusted with 4 DA2 AUDIO LEVEL control on page 13.

7 [DA3 AUDIO MODE SELECT] switch

Selects the audio recording level adjusting method for the [DA3 IN] connector on the rear panel.

AUTO : The audio recording level is held at the reference level even when sounds greater than the reference input level are input.
The recording level does not increase when the input level is low.

MANUAL : The recording level can be adjusted with 3 DA3 AUDIO LEVEL control.

8 [DA4 AUDIO MODE SELECT] Switch

Selects the audio recording level adjusting method for the [DA4 IN (MIC1 IN)] connector on the front section.

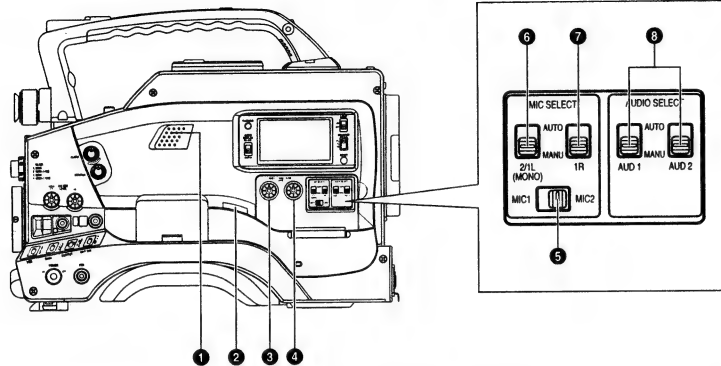
AUTO : The audio recording level is held at the reference level even when sounds greater than the reference input level are input.
The recording level does not increase when the input level is low.

MANUAL : The audio recording level can be adjusted with 4 DA4 AUDIO LEVEL control.

2. CONTROLS, INDICATORS AND CONNECTORS

2-3 Right Side Section (Cont'd) (E-ver.)

[Audio Setting Section]



1 Monitoring loudspeaker

- Enables EE monitoring of the input audio signal during recording, in the record-pause mode or in the stop mode.
- Outputs the playback sound in the playback mode.
- The PCM audio channels to be output can be selected using the 2 AUDIO DISPLAY switch on page 16.
- The loudspeaker volume can be adjusted with the AUDIO MONITOR control. The audio from the loudspeaker is defeated when an earphone is plugged into the EARPHONE jack. The warning alarm tones are also output through this loudspeaker. For details, see pages 81 and 82.

2 Lithium Battery Installation Case

Installs a lithium battery in this case. The battery is used for the backup of the time code and the date/time data. The DY-90 is delivered without the battery installed. Install the lithium battery provided (CR2032). See page 34 for information about how to install it.

3 [AUD1 LEVEL] control

Adjusts the recording level of the audio signal input to the [AUD 1 IN] terminal on the rear panel. This control is effective when 6 AUDIO 1 SELECT switch is set to the "AUTO" position.

4 [AUD2 LEVEL] control

Adjusts the recording level of the audio signal input to the [AUD 2 IN] terminal on the rear panel. This control is effective when 6 AUDIO 2 SELECT switch is set to the "AUTO" position.

5 [MIC1/MIC2] select switch

Select the camera's microphone mode with this switch.

- MIC1** : Records the audio signal of the microphone connected to the [MIC1] connector.
- MIC2** : Records the audio signal of the microphone connected to the [MIC2] connector.

6 [MIC2/1L (MONO)] auto/manual select switch

Selects the recording level adjusting method for the camera microphones:

- Microphone of MIC 2 connector.
- Monaural microphone of MIC 1 connector
- Stereo microphone L channel of MIC 1 connector
- MIC 1 or MIC 2 can be selected with the 5 [MIC1/MIC2] SELECT switch.

AUTO : The audio recording level is held at the reference level even when sounds greater than the reference input level are input. The recording level does not increase when the input level is low.

MANU : The recording level can be adjusted with 7 [MIC1R] (MONO) 2/L REC LEVEL control on page 13.

7 [MIC1R] auto/manual select switch

This switch selects the recording level adjusting method for the R-channel of the stereo microphone connected to the [MIC1] connector.

AUTO : The audio recording level is held at the reference level even when sounds greater than the reference input level are input. The recording level does not increase when the input level is low.

MANU : The recording level can be adjusted with 7 1R REC LEVEL control on page 13.

8 [AUD1+2] auto/manual select switch

Selects the recording level adjusting method for the audio signals input to the AUDIO INPUT connectors on the rear panel. Selection is made for each signal input to AUD 1 IN and AUD 2 IN connectors separately.

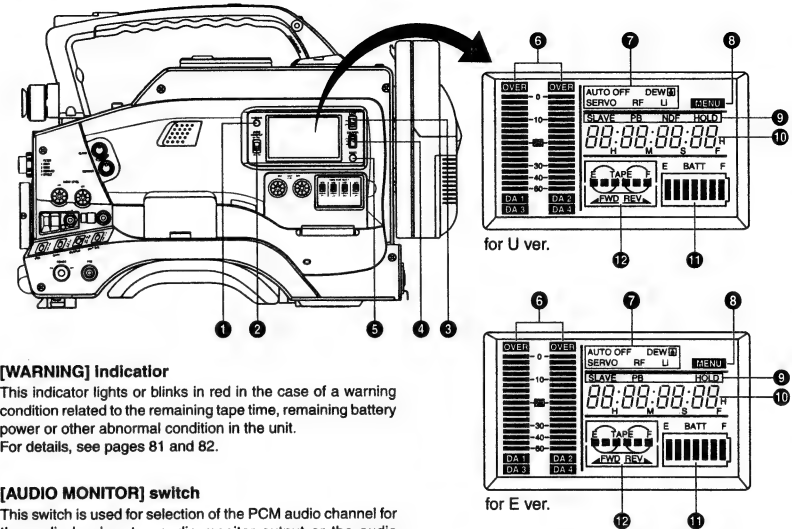
AUTO : The audio recording level is held at the reference level even when sounds greater than the reference input level are input. The recording level does not increase when the input level is low.

MANU : The recording level can be adjusted with 3 or 4 AUDIO REC LEVEL control.

2. CONTROLS, INDICATORS AND CONNECTORS

2-3 Right Side Section (Cont'd)

[VCR Display]



1 [WARNING] indicator

This indicator lights or blinks in red in the case of a warning condition related to the remaining tape time, remaining battery power or other abnormal condition in the unit. For details, see pages 81 and 82.

2 [AUDIO MONITOR] switch

This switch is used for selection of the PCM audio channel for the audio level meter, audio monitor output or the audio playback output.

DA1/DA2 : Audio signals from the PCM audio DA1 and DA2 channels are output.

DA3/DA4 : Audio signals from the PCM audio DA3 and DA4 channels are output.

Note:

Regardless of this switch the DA1/DA2 channel audio signal is in playback the during Search Mode.

3 [LIGHT] switch

Turns the display back light ON or OFF.

ON : The display is back-lighted.

OFF : The display is not back-lighted.

(Keep this switch to OFF during battery operation of the DY-90 or when it is required to reduce the power consumption for a certain reason.)

4 [COUNTER] switch

Selects the contents displayed on the LCD counter.

CTL : Set to this position to display the CTL counter.

TC : Set to this position to display time codes or when pre-setting the time code.

UB : Set to this position to display the user's bits of time codes or presetting the user's bit.

- Time codes or user's bits can be displayed provided that the TC DISP switch in the time code/setup menu setting block is set to TC. If it is set to SUB TC, the date and time data is displayed in its place.

5 [RESET] button

- Press to reset the CTL counter value.
- Pressing the button during time code or user's bit presetting operation resets the time code or user's bit data to "00:00:00:00".

6 Audio level meters

- Shows the audio input level of the DA1 and DA2 channels in the record mode or EE mode.
- For selection of the audio channels to be displayed, use the 2 AUDIO MONITOR switch.
- The peak output level is held for approximately 2 seconds.

Note:

The level meter activated immediately after the power is switched ON. This is not a malfunction.

2. CONTROLS, INDICATORS AND CONNECTORS

2-3 Right Side Section (Cont'd)

7 Warning indicators

■ AUTO OFF indicator

Lights when a non-recoverable error (e.g. tape winding error, drum stopped, etc.) occurs with the VCR. This indicator also lights if condensation occurs.

For details, see "TROUBLES WITH ERROR CODE OUTPUTS" on page 84.

■ DEW indicator

Lights when condensation (dewing) occurs on the drum or other mechanism in the unit.

The unit rejects all operations while this indicator is lit. When the condensation has disappeared, the indicator turns off and the unit accepts operations again.

■ SERVO indicator

Lights when the drum servo is troubled during recording to indicate that normal recording is not being made.

■ RF indicator

Lights when the video head is clogged.

The head clog is detected during back-space between different scenes. Note that it is not detected during recording.

- Should this indicator light up, clean the head using the special head cleaning tape. See the manual for the head cleaning tape (DCL-5) which is specifically made for this unit.

■ Li indicator

This is the lithium battery indicator which lights when the lithium battery which backs up data of the built-in time code generator is nearly exhausted and indicate the necessity of replacement.

See page 34 for information about How to Replace Backup Lithium Batteries.

8 MENU indicator

This indicator lights when the setup menu mode is engaged by pressing **1** MENU button on page 18.

9 Time code-related indicators

■ SLAVE indicator

This is the slave lock indicator which lights when the built-in time code generator is slave-locked (synchronized) with the LTC time code signal input at the TC IN connector.

For the slave lock of the time code, see page 58.

■ PB indicator

This is the time code playback indicator which lights when the time code is in playback mode.

■ NDF indicator (U-ver. only)

This is non-drop frame indicator which lights when the framing mode of the built-in time code generator or the reproduced time code in play mode is in the non-drop frame mode. This indicator does not light in drop frame mode.

- If lights permanently when the CTL counter is in use.

■ HOLD indicator

Lights when the time code generator display is held by pressing the HOLD button in the time code setting block.

The time code or user's bit can be preset while this indicator is lit.

10 Counter display

- Usually, this section shows the data of the CTL counter, time code or user's bit. The display mode can be selected with the **1** COUNTER switch.

- With the COUNTER switch set to "TC" or "UB", when **8** TC DISP switch on page 18 is set to the "SUB TC" position, time and date are displayed.

- Displays the setup menu data when the DY-90 is in the setup menu mode by pressing **1** MENU button on page 18. The setup menu includes the hour meter (drum operating time).

- This section shows an error code when an abnormal condition occurs with the VCR. For details on the counter display, see page 22.

11 Remaining battery power indicator

Shows the remaining battery power with a 7-dot segment bar display.

- To display the remaining battery power accurately, set the setup menu item "BATT. TYPE SELECT" according to the type of the battery pack in use. For details on the remaining battery power display, see page 22.

12 Cassette/tape direction/remaining tape time indicators

- Cassette tape : Lights when the unit is loaded with a cassette tape. Blinks during ejection or tape loading.



- Tape direction : One of the indicators lights according to the tape transport direction.



- Remaining tape : The remaining tape situation is shown with a 6-dot segment bar display.

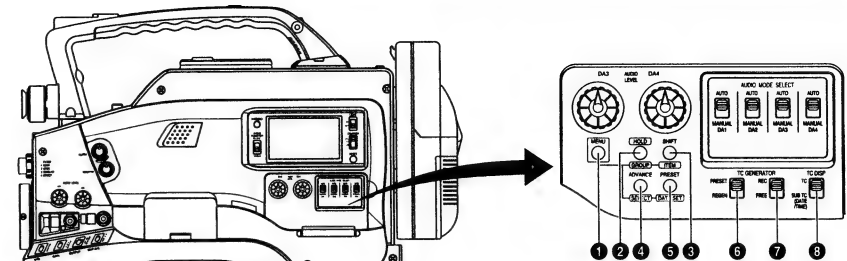


For details on the remaining tape display, see page 22.

2. CONTROLS, INDICATORS AND CONNECTORS

2-3 Right Side Section (Cont'd)

[VCR Setup Block]



1 [MENU] button

Press this button to enter the setup menu mode.

When the setup menu mode is engaged, the "MENU" indicator in the LCD display lights and the counter display is changed to the menu indication.

In the setup menu mode, pressing this button resumes the normal mode.

2 [HOLD/GROUP] button

- Press when presetting the time code or user's bit. The presently displayed data is held (the HOLD indicator lights on the display) and the leftmost digit of the counter blinks. Pressing this button during time code or user's bit presetting cancels the operation and recalls the previous display contents.

- In setup menu mode, this button is used to select the menu group.

3 [SHIFT/TEM] button

- During time code or user's bit presetting, press to select the digit to be set. Each press of the button shifts the digit to be set (which blinks) to the right.

- In setup menu mode, this button is used to select the menu item.

4 [ADVANCE/SELECT] button

- During time code or user's bit presetting, press to select the value of the digit to be set. Each press of the button increases the number by 1.

- In setup menu mode, this button is used to select the value of a menu item.

5 [PRESET/DATA SET] button

- During time code or user's bit presetting, press to save the set value in the preset memory. The set time code or user's bit will be preset in the time code generator.

- In setup menu mode, this button is used to save the menu item setting the data in the memory.

- For details of the time code or user's bit presetting, see page 56.
- For details on the setup menus, see page 62.
- The buttons from **2** to **5** above are also used in setting the date and time of SUB TC data. For the date and time setting, see page 61.

Time code generator setting switches

6 [PRESET/REGEN] switch

Selects the time code generator mode between PRESET and REGEN.

PRESET : Preset mode. Set to this position when newly pre-setting and recording the time code. Also use this position when the unit is to be slave-locked to an external time code generator connected to the TC IN connector.

REGEN : Regeneration mode, in which the unit reads existing time codes on the tape and records time codes by succeeding them. Set to this position when you want to connect additional time codes to a tape in which time codes have already been recorded as far as the middle.

7 [REC/FREE] run switch

Selects the time code running mode while the time code generator is in preset mode. This switch is not effective in the REGEN mode.

REC : The time code runs only during recording. This position allows you to record continual time codes when recording scenes one after another.

FREE : The time code runs permanently. Set to this position when the unit is slave-locked with an external time code generator.

- If this position is used when recording scenes one after another, the time codes become discontinuous at the change points between scenes.

8 [TC DISP] switch

When the **1** COUNTER switch on page 16 is set to TC or UB, it selects the type of time code to be displayed on the counter display.

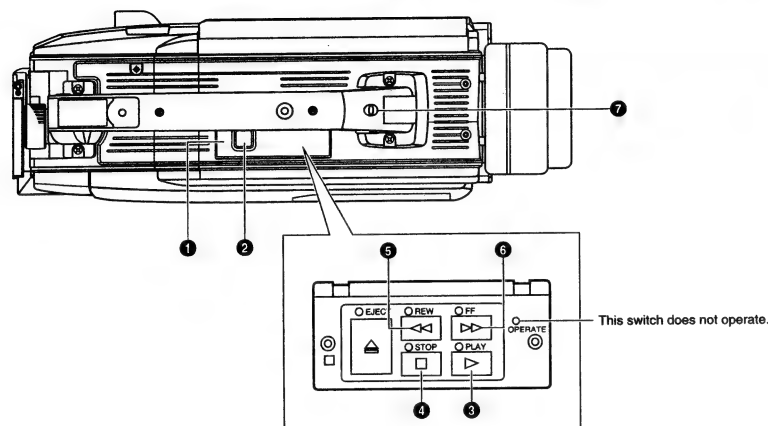
TC : Ordinary time codes or user's bits are displayed.

SUB TC : Data in another time code area (sub-time code area) is displayed. This unit records the date and time data in this area.

For details, see "SUB-TIME CODE" on page 60.

2. CONTROLS, INDICATORS AND CONNECTORS

2-4 Top Section



1 Operation cover

Open this cover when operating the playback mode. Otherwise keep this cover closed.

2 [EJECT] button

Press to eject the cassette tape. It can be pressed even when the operation cover is closed. The LED indicator above the EJECT button lights up during the ejection operation.

3 [PLAY] button

Press to start playback. In play mode, the unit outputs the video and audio signals of normal playback and the LED indicator above the PLAY button lights.

- If the auto tracking is active at the moment the play mode starts, the playback video will be interfered with digital noise. The audio output during this period is the linear track audio. The same audio signals as the PCM audio DA1/DA2 channels are recorded on the linear tracks of the tape. The PCM audio DA3 and DA4 channels are not recorded on the linear tracks.

4 [STOP] button

Press to enter stop mode. The drum keeps rotating in stop mode. However, when stop mode has continued for about 30 minutes, the VCR section enters tape protect mode, in which the drum stops rotation and the tape tensioner is released. It takes more time than usual to enter the record or play mode from the tape protect mode. The LED indicator above the STOP button lights in stop and tape protect modes.

- The time until tape protect mode is initiated can be set to 1, 5 or 30 minutes with setup menu item "LONG PAUSE TIME SELECT".

5 [REW] button

Press to rewind tape.

- Pressing the button in stop or fast forward mode initiates rewind mode. The LED indicator above the REW button lights in this mode.
- Pressing the button during playback or forward search initiates reverse search at about 6 times the normal play speed. The LED indicators above the PLAY and REW buttons light during reverse search. The search audio recorded in the linear track is reproduced during reverse search.

6 [FF] button

Press to fast forward tape.

- Pressing the button in stop or rewind mode initiates fast forward mode. The LED indicator above the FF button lights in this mode.
- Pressing the button during playback or reverse search initiates forward search at about 6 times the normal play speed. The LED indicators above the PLAY and FF buttons light during forward search. The search audio recorded in the linear track is reproduced during forward search.

7 Back tally lamp

This lamp lights up when this unit enters the record mode. It blinks during the transition to the record mode. It also blinks when an error occurs on the DY-90.

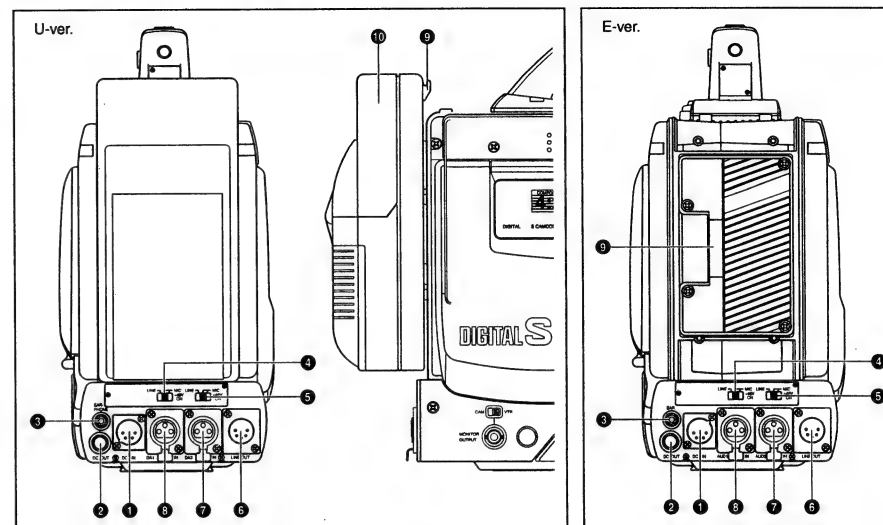
- This lamp does not light up when the "BACK TALLY" item in the camera's main menu screen is set to OFF. (See page 67.)

Note:

The buttons 2 ~ 6 are not effective during recording.

2. CONTROLS, INDICATORS AND CONNECTORS

2-5 Rear Section



1 [DC IN] connector (XLR 4-pin)

Power input connector for 12 V DC. Connect with the optional AA-G10 or AA-P250 battery charger.

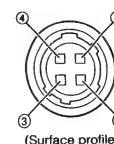
When a cable is connected here, the power supply from the battery pack is interrupted and the source is switched to the power supplied through this connector.



NO.	Signal
1	GND
2	—
3	—
4	DC12V

2 [DC OUT] connector

Power output connector to a wireless microphone transmitter, etc. The supply voltage is identical to the voltage supplied to the unit (DC 12V max. 0.1 A).



NO.	Signal
1	GND
2	—
3	—
4	DC12V (Power through)

3 [EARPHONE] earphone jack

This is a stereo mini-jack for use in connecting an audio monitoring earphone. Plug in a 3.5 mm dia. earphone or headphone plug.

The earphone can also be used to monitor alarm tones depending on situations.

The sound from the monitoring loudspeaker is interrupted when an earphone is connected here.

4 [DA1 IN LINE/MIC] select switch (U-ver.)

Select the audio signal input to the DA1 IN connector.

LINE : Set to this position when connected to the audio equipment, etc. The reference input level is +4 dBs.

MIC : Set to this position when the microphone is connected. The reference input level is -60 dBs.

MIC +48V ON : Set to this position when the microphone requiring +48 V power supply (JVC MV-P615, etc.) is connected.

A +48 V DC is supplied from this connector.

4 [AUD1 IN LINE/MIC] select switch (E-ver.)

Select the audio signal input to the AUD1 IN connector.

LINE : Set to this position when connected to the audio equipment, etc. The reference input level is +4 dBs.

MIC : Set to this position when the microphone is connected. The reference input level is -60 dBs.

MIC : Set to this position when the microphone requiring

+48V ON +48 V power supply (JVC MV-P615, etc.) is connected.

A +48 V DC is supplied from this connector.

2. CONTROLS, INDICATORS AND CONNECTORS

2-5 Rear Section (Cont'd)

⑤ [DA3 IN LINE/MIC] select switch (U-ver.)

Select the audio signal input to the ⑦ DA3 IN connector.

LINE : Set to this position when connected to the audio equipment, etc. The reference input level is +4 dBs.

MIC : Set to this position when the microphone is connected. The reference input level is -60 dBs.

MIC : Set to this position when the microphone requiring

+48V ON : +48 V power supply (JVC MV-P615, etc.) is connected.

A +48 V DC is supplied from this connector.

⑥ [AUD2 IN LINE/MIC] select switch (E-ver.)

Select the audio signal input to the ⑦ AUD2 IN connector.

LINE : Set to this position when connected to the audio equipment, etc. The reference input level is +4 dBs.

MIC : Set to this position when the microphone is connected. The reference input level is -60 dBs.

MIC : Set to this position when the microphone requiring

+48V ON : +48 V power supply (JVC MV-P615, etc.) is connected.

A +48 V DC is supplied from this connector.

⑥ [LINE OUT] connector (XLR 5-pin)

Outputs the PCM audio DA1/DA2 or DA3/DA4 channel signals in analog audio.

The audio channels to be output can be selected by the ② AUDIO MONITOR switch on page 16.

- Outputs the input audio signal in the record, record-pause and stop modes.
- Outputs the playback audio signal in the playback mode.
- Alarm sound is not output.



NO.	Signal
1	GND
2	DA1/3 (H)
3	DA1/3 (C)
4	DA2/4 (H)
5	DA2/4 (C)

⑦ [DA3 IN] DA3 Input connector (XLR 3-pin) (U-ver.)

Connect the external audio equipment or microphone to this connector. Set the ⑤ DA3 IN LINE/MIC select switch according to the connected equipment.

The audio signal from this connector is recorded on the DA3 of the PCM audio channel.

* It is not recorded on the linear track of the tape for audio search.

⑦ [AUD2 IN] Audio 2 input connector (XLR 3-pin) (E-ver.)

Connect the external audio equipment or microphone to this connector. Set the ⑥ AUD 2 IN LINE/MIC select switch according to the connected equipment.

⑧ [DA1 IN] DA1 input connector (XLR 3-pin) (U-ver.)

Connect the external audio equipment or microphone to this connector. Set the ⑤ DA1 IN LINE/MIC select switch according to the connected equipment.

The audio signal from this connector is recorded on the DA1 of the PCM audio channel.

It is recorded on the linear track of the tape for audio search.

(AUDIO IN connector)



NO.	Signal
1	GND
2	HOT
3	COLD

⑧ [AUD1 IN] Audio 1 input connector (XLR 3-pin) (E-ver.)

Connect the external audio equipment or microphone to this connector. Set the ⑤ AUD 1 IN LINE/MIC select switch according to the connected equipment.

For information about which channel of the tape the audio signal from the audio input connectors ⑧, ⑨ is recorded, see page 64.

(AUDIO IN connector)



NO.	Signal
1	GND
2	HOT
3	COLD

⑨ Battery case release button

Push to unlock the battery case cover. The battery case cover should be opened while pushing this button.

⑩ Battery holder

Mount the Anton-Bauer battery pack here.

For battery information and the attaching/detaching method of the battery, see page 35.

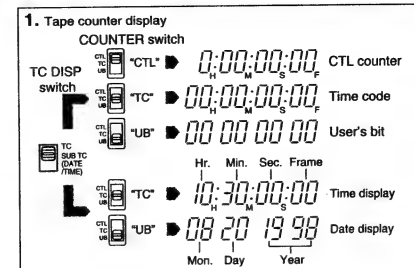
⑩ Battery case

Load a Flat Shape Type battery pack or the JVC NB-G1U battery pack.

For details, see "USING JVC'S NB-G1 OR FLAT SHAPE TYPE BATTERY PACK" on page 36.

2. CONTROLS, INDICATORS AND CONNECTORS

2-6 Counter Display Contents (U-ver.)



[MENU] button

In case of VCR error

2. Setup menu setting display

4:tc 0 :df

[GROUP] button

3. Hour meter display

1:dr-02:00h

Remaining Tape Time Display

The 6-dot segment bar display shows the remaining tape time in record and play modes. The lighted segment bars decrease as the remaining tape decreases.

The reference tape time is as shown below.

(■ : Lighted. ◐ : blinked.)

E	TAPE	F	
■	■	■	Near the beginning of tape
■	■	■	More than 25 minutes of remaining tape. ("F" extinguished.)
■	■	◐	10 to 15 minutes of remaining tape. (This display represents the beginning of the tape in the case of DS-10 tape.)
■	■	◐	2 to 5 minutes of remaining tape.
■	■	◐	Less than 2 minutes of remaining tape. (The last dot and "TAPE" blink.)
■	■	◐	End of tape. ("TAPE" and "E" blink.)

- When the tape has ended completely, a warning is provided by an alarm tone, etc.
- The remaining tape information is not displayed when no cassette tape is loaded or during the remaining tape calculation which takes place immediately after a cassette tape is inserted.

The counter display shows the following 4 types of information.

1. Tape counter display

The counter display usually functions as a tape counter (hour, minute, second, frame). It can be switched to a CTL counter, time code or user's bit display by using the COUNTER switch. (Provided that the TC DISP switch is set to TC)

• CTL counter : Time between -9 hr. 59 min. 59 sec. 29 frames and 9 hr. 59 min. 59 sec. 29 frames can be displayed.

• Time code : Time between 0 hour and 23 hr. 59 min. 59 sec. 29 frames can be displayed.

• User's bit : Hexadecimal number from 0 to F is displayed in 8 digits.

By setting the TC DISP switch under a cover on the right side panel to SUB TC, the time and date data can be displayed here.

- When the COUNTER switch is set to TC : The time (hour, minute, second, frame) is displayed.
- UB : The date : (month, day, year) is displayed.

- Press the MENU button to switch to the VCR setup menu setting display.

2. Setup menu setting display

This display is used when setting the setup menus.

After having set the setup menus, press the MENU button to return to the tape counter display.

For details, see "VCR SETUP MENUS" on page 63.

3. Hour meter display

The hour meter is displayed in the setup menu Group 1.

The hour meter data refers to the head drum running time.

4. Error code display

The error code is displayed automatically in case an abnormal condition occurs with the VCR section.

For details of error codes, see "TROUBLES WITH ERROR CODE OUTPUTS" on page 84.

Remaining Battery Power Display

The 7-dot segment bar display shows the remaining battery power. The lighted segment bars decrease as the remaining battery power decreases.

- To display the remaining battery power accurately, set the setup menu item "BATT. TYPE SELECT" according to the type of the battery pack in use.



All segment bars light when a fully-charged battery pack is attached.



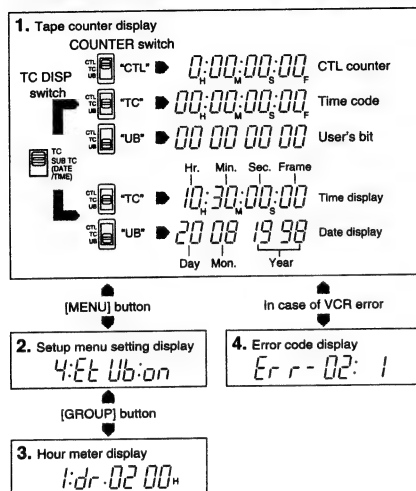
The last 2 segment bars and "BATT" start to blink when the battery is nearly exhausted. Replace with a fully-charged battery pack.



When the battery capacity has run out, "E" and "BATT" blink and the unit stops operation automatically.

2. CONTROLS, INDICATORS AND CONNECTORS

2-6 Counter Display Contents (E-ver.)



Remaining Tape Time Display

The 6-dot segment bar display shows the remaining tape time in record and play modes. The lighted segment bars decrease as the remaining tape decreases.

The reference tape time is as shown below.

(■ : Lighted. ● : blinked.)

E TAPE F ■ ■ ■ ■ ■ ■	Near the beginning of tape
E TAPE ■ ■ ■ ■ ■ ■	More than 25 minutes of remaining tape. ("F" extinguished.)
E TAPE ■ ■ ■ ■ ■ ■	10 to 15 minutes of remaining tape.
E TAPE ■ ■ ■ ■ ■ ■	2 to 5 minutes of remaining tape.
E TAPE ■ ■ ■ ■ ■ ■	Less than 2 minutes of remaining tape. (The last dot and "TAPE" blink.)
E TAPE ■ ■ ■ ■ ■ ■	End of tape. ("TAPE" and "E" blink.)

- When the tape has ended completely, a warning is provided by an alarm tone, etc.
- The remaining tape information is not displayed when no cassette tape is loaded or during the remaining tape calculation which takes place immediately after a cassette tape is inserted.

The counter display shows the following 4 types of information.

1. Tape counter display

The counter display usually functions as a tape counter (hour, minute, second, frame). It can be switched to a CTL counter, time code or user's bit display by using the COUNTER switch. (Provided that the TC DISP switch is set to TC)

- CTL counter : Time between -9 hr. 59 min. 59 sec. 24 frames and 9 hr. 59 min. 59 sec. 24 frames can be displayed.
- Time code : Time between 0 hour and 23 hr. 59 min. 59 sec. 24 frames can be displayed.
- User's bit : Hexadecimal number from 0 to F is displayed in 8 digits.

By setting the TC DISP switch under a cover on the side panel to SUB TC, the time and date data can be displayed here.

- When the COUNTER switch is set to TC : The time (hour, minute, second, frame) is displayed.
- UB : The date (day, month, year) is displayed.

- Press the MENU button to switch to the VCR setup menu setting display.

2. Setup menu setting display

This display is used when setting the setup menus. After having set the setup menus, press the MENU button to return to the tape counter display. For details, see "VCR SETUP MENUS" on page 63.

3. Hour meter display

The hour meter is displayed in the setup menu Group 1. The hour meter data refers to the head drum running time.

4. Error code display

The error code is displayed automatically in case an abnormal condition occurs with the VCR section. For details of error codes, see "TROUBLES WITH ERROR CODE OUTPUTS" on page 84.

Remaining Battery Power Display

The 7-dot segment bar display shows the remaining battery power. The lighted segment bars decrease as the remaining battery power decreases.

- To display the remaining battery power accurately, set the setup menu item "BATT. TYPE SELECT" according to the type of the battery pack in use.



All segment bars light when a fully-charged battery pack is attached.



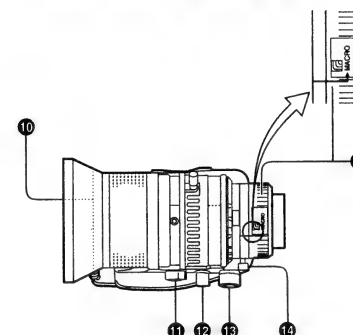
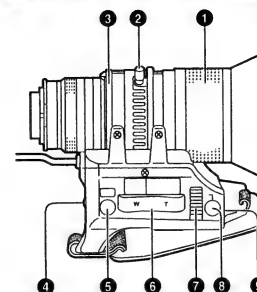
The last 2 segment bars and "BATT" start to blink when the battery is nearly exhausted. Replace with a fully-charged battery pack.



When the battery capacity has run out, "E" and "BATT" blink and the unit stops operation automatically.

2. CONTROLS, INDICATORS AND CONNECTORS

2-7 Lens (optional)



1 FOCUS ring

Manual focus ring.

2 ZOOM lever/ring

This is the manual zoom ring equipped with a zoom lever. To activate the zoom feature on, turn the zoom mode knob ⑪ to position "M".

3 IRIS ring

Manual Iris ring. To activate the auto iris feature, set the Iris Mode switch ⑦ to A.

4 [VTR] Trigger button

To start shooting push once.
To stop shooting push again.

5 [RET] return video button

The return video signal from the VCR section can be monitored on the viewfinder only while pushing this button.

- The Viewfinder Status display is not available during this operation.

6 ZOOM servo control lever

Pushing this lever in the W direction makes the lens move wider.

Pushing this lever in the T direction makes the lens move tighter. Pushing harder changes the speed of the Zoom. To operate the servo zoom feature with this lever, set the ZOOM knob ① to S.

7 IRIS mode switch

A : Activates the auto iris feature.
M : Allows manual iris control.

8 Momentary auto Iris button

When the IRIS MODE switch is at M, pushing this button activates the Auto Iris Function while it is held down only.

9 IRIS speed adjusting control

Adjusts the iris operation speed.

10 FILTER screw

Protect the lens with a Clear or UV filter by screwing on to the front inside of the lens hood. Other filters can be used for various effects.

11 ZOOM mode knob

S : Servo Zoom mode. Allows operation by the Zoom Servo Control lever ⑥.
M : Manual Zoom mode. Allows zoom control by the Zoom lever/ring ②.

12 REMOTE FOCUS control connector

To connect with an optional focus servo unit.

13 ZOOM servo connector

Connect with an optional zoom servo unit.

14 BACK FOCUS ring/fixing screw

For Set-up Back Focus adjustment only. Secure with the Screw knob after adjustment.

15 Macro focusing ring (for close-up shooting)

By rotating this ring in the direction of the arrow, the lens becomes capable of close-up shooting of very small objects. Normal focus adjustment and zooming are not available in the macro mode.

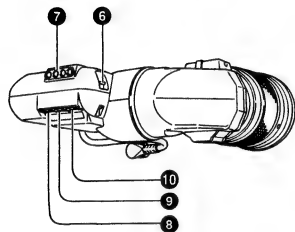
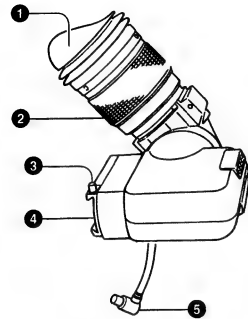
To shoot images in the macro mode, set the focus ring to the infinite position and the zoom ring to the widest angle position. To adjust the focus of the macro image, rotate this ring in the direction of arrow until the object is focused.

CAUTION :

The back-focus knob is located close to the macro ring, be careful not to mistake the back-focus knob for the macro ring. After the required operation, be sure to return the macro ring to the normal position.

2. CONTROLS, INDICATORS AND CONNECTORS

2-8 1.5-Inch Viewfinder VF-P116 (optional)

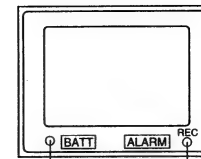


- 1 Eyepiece**
Blocks light to viewfinder screen and holds eye optics.
The Eyepiece can be opened to view the screen directly.
- 2 Eyepiece focusing ring**
Rotate this ring to adjust the viewing angle.
Be sure to adjust this ring because the viewing angle affects the lens focus adjustment.
To perform more reliable focus adjustment, it is recommended to turn on the contour with the PEAKING control 8.
- 3 Stopper screw**
This stopper screw prevents the viewfinder from coming off the camera.
- 4 Viewfinder shoe**
Attaches to the Viewfinder Mount base on camera.
- 5 Cable**
Connect to camera viewfinder connector.
- 6 Tally switch**
Set this switch to off if you do not want to inform the subjects by the Tally light that they are being recorded.
ON : Lights the Tally lamp 7 during recording.
OFF : Does not light the Tally lamp 7.
However, the REC lamp at the eyepiece will not turn off.
- 7 Tally light**
Lights when recording is in progress.
The light does not come on when the Tally Switch 6 is at "OFF".
- 8 [PEAKING] peaking (contour) control**
Rotate to adjust the contour of the viewfinder screen image.
- 9 [CONT] contrast**
Controls the level of Viewfinder contrast.
- 10 [BRIGHT] brightness**
Controls the level of Viewfinder brightness.

2. CONTROLS, CONNECTORS AND INDICATORS

2-9 Viewfinder Display

WARNING INDICATORS INSIDE THE VIEWFINDER



BATT LIGHT REC/ALARM LIGHT

The viewfinder has two LED indicators below the screen. These LEDs light or blink to indicate the present status of the camera or the VCR's camera control unit.

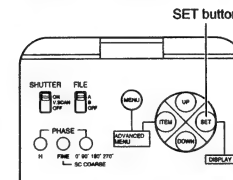
- **[BATT] BATTERY LIGHT**
This blinks red when battery voltage becomes too low for the camera to operate.
This lights when the battery has run out.
- **[REC/ALARM] LIGHT**
This lights green for these conditions.
Solid Green : While recording.
Blinks Green : • While the VCR prerolls before recording.
• If the Tape is finishing.
• If the VCR Malfunctions

VIEWFINDER SCREEN DISPLAY

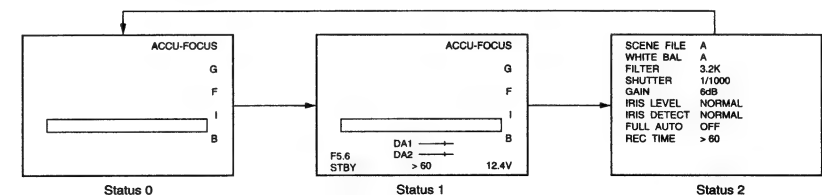
The viewfinder screen displays the following information, however, these are not displayed during VCR playback.

- Status screens (screens for use in checking the current camera setup)
- Alarm message display
- Safety zone display
- Setting screen (screen for use in the camera setup)
- Auto white balance display
- Shutter speed display

■ Status Screens

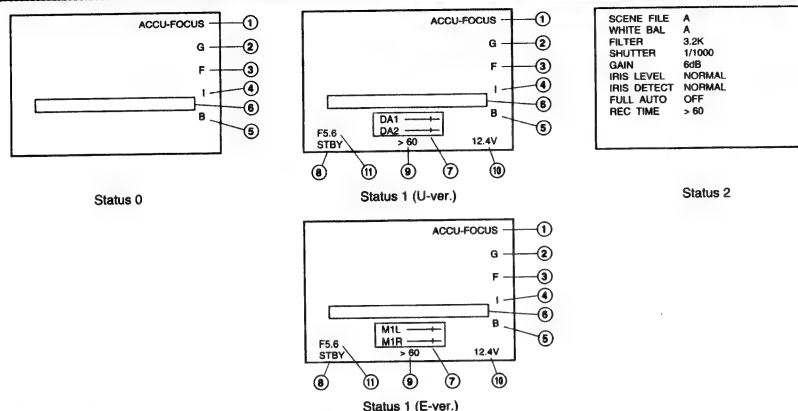


Press the SET button during normal screen to display one of the status screens on the viewfinder. One of the three status screens will be displayed every time the button is pressed.



2. CONTROLS, CONNECTORS AND INDICATORS

2-9 Viewfinder Display (Cont'd)



● Status 0

Display Position	Display	Function
①	ACCU-FOCUS	Blinking or displayed during the ACCU-FOCUS operation.
	S	Displayed when the Shutter or V. Scan is ON.
	FAS	Displayed when the Full Auto Shooting is ON.
	ALC	Indicator which appears when the individual ALC is ON.
②	G	Displayed in other modes than 0 dB, LOLUX and ALC.
	L	Displayed during LOLUX operation.
③	F	Displayed when the FAW is ON.
④	I	Displayed when the Auto iris level is set to the back light or spotlight operation.
⑤	B	Displayed during the black stretch or black compression switch operation.
⑥	Event display	See the table below.

⑥ Event display

Event is displayed for only about 2 seconds on the viewfinder screen when any of the following switches is operated.

Switch	Event Display Contents	
ZEBRA	ZEBRA	ON, OFF
BLACK STRETCH/ BLACK COMPRESS	BLACK	STRETCH, NORMAL, COMPRESS
GAIN	GAIN	-3 dB, 0 dB, 6 dB, 9 dB, 12 dB, 18 dB, ALC
WHT. BAL	WHITE BAL	A, B, PRESET, FAW
FULL AUTO	FULL AUTO	ON, OFF
IRIS	IRIS	BACK.L, NORMAL, SPOT.L
LOLUX	LOLUX	ON, OFF
FILTER control	FILTER	3.2K, 5.6K, 5.6K+ND, EFFECT
FILE	SCENE FILE	A, B, OFF
VTR	VTR	STBY, SAVE
AUTO KNEE	AUTO KNEE	ON, OFF

2. CONTROLS, CONNECTORS AND INDICATORS

2-9 Viewfinder Display (Cont'd)

● Status 1

In addition to the information on the status 0 screen, this screen displays information on the audio indicator, accumulated recording time, voltage and lens F number.

Display position	Display	Function
⑦ (U-ver.)	DA1----- DA2----- (example)	Shows the audio input channel and input level. Input channel indication is changed depending on the setting of the AUDIO MONITOR switch. Display ON/OFF can be selected by the menu screen. For details on "AUDIO DISPLAY", see page 67.
⑦ (E ver.)	M1L----- M1R----- (example)	Shows the audio input channel and input level. Input channel indication is changed depending on the setting of the AUDIO DISPLAY switch. Display ON/OFF can be selected by the menu screen. For details on "AUDIO DISPLAY", see page 67.
⑧	STBY SAVE STOP REC FF REW EJECT	VCR in standby mode VCR in save mode VCR in stop mode VCR in record mode VCR in fast-forward mode VCR in rewind mode VCR in eject mode
⑨	> 60 (Example) 12v 34w 56s 20r	Remaining tape indication (displayed in 1-minute steps) Time code display Time code display is available when the "REC TIME" item on the advanced menu screen is set to TIME CODE. For details on "REC TIME", see page 69.
⑩	12.4 V (example) 50 % (example)	Voltage indication (displayed in 0.1 V steps) When an Anton-Bauer battery is connected and if the remaining battery power is detected, it shows the remaining battery power displayed as a percentage (%) figure. (In this case, the voltage indication is not displayed.)
⑪	OPEN, F2, F2.8, F4, F5.6, F8, F11, F16, CLOSE	Shows the F number of the connected lens. It is not displayed when the lens is removed. Also for some lenses, no display appears. Display ON/OFF can be selected in the menu screen. For details on "F NO DISPLAY", see page 67.

Note:
The level meter activated immediately after the power is switched ON. This is not a malfunction.

● Status 2

This screen displays the camera setup.

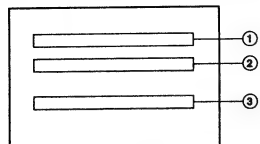
Event display is not available while this screen is displayed.

Display	Display Contents
SCENE FILE	A, B, OFF
WHITE BAL	A, B, PRESET, FAW
FILTER	3.2K, 5.6K, 5.6K+1/16ND, EFFECT (U ver.) 3.2K, 5.6K, 5.6K+1/4ND, 5.6K+1/16ND (E ver.)
SHUTTER	OFF, 1/100 (U-ver.) / 1/120 (E ver.), 1/250, 1/500, 1/1000, 1/2000, V.SCAN(1/60.5 to 1/1966.7) ; U-ver/(1/50.4 to 1/1953.1) ; E-ver, EEI (in ALC mode)
GAIN	-3 dB, 0 dB, 6 dB, 9 dB, 12 dB, 18 dB, LOLUX, ALC
IRIS LEVEL	BACK.L, NORMAL, SPOT L
IRIS DETECT	NORMAL, PEAK, AVG
FULL AUTO	ON, OFF
REC TIME	Tape remaining time or time code

2. CONTROLS, CONNECTORS AND INDICATORS

2-9 Viewfinder Display (Cont'd)

■ Alarm Message Display



The following alarm messages are displayed on the status 0 and status 1 screens.

Display position	Display	Contents
①	LOW BATTERY	The battery capacity is nearly exhausted.
②	VTR WARNING [HEAD] VTR WARNING [SERVO] VTR WARNING [DEW] VTR WARNING [HARD]	Head clog Servo error Condensation Hardware error
③	TAPE NEAR END TAPE END REC INHIBIT NO TAPE	Tape remaining time is less than approx. 3 minutes in the record mode Tape end reached VTR trigger is pressed with a non-recordable cassette (REC switch on the back of the cassette is set to OFF) loaded VTR trigger is pressed with no tape

2. CONTROLS, CONNECTORS AND INDICATORS

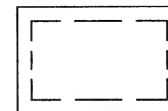
2-9 Viewfinder Display (Cont'd)

■ Safety Zone

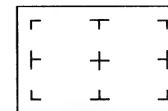
Three types of safety zone can be displayed in the viewfinder. Select the required one with the SAFETY ZONE item on the main menu screen.



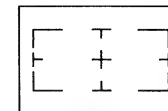
OFF



ZONE 1



ZONE 2



ZONE 3

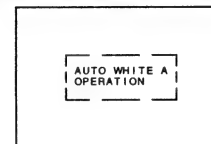
■ Setting the Screen Display

```

---MENU---
SCENE FILE A
DETAIL          :NORMAL
MASTER BLACK   :NORMAL
IRIS            :NORMAL
V. RESOLUTION  :NORMAL
BACK TALLY     :ON
F. NO. DISPLAY :ON
AUDIO DISPLAY  :ON
SAFETY ZONE    :OFF
SET UP BOX OPERATE
    
```

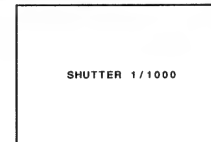
Screen for use in the date setting and other camera setups.
See the flow of MENU screen on page 65.

■ Auto White Balance Display



This screen appears during the auto white balance adjustment operation to display various data.
See "White Balance Adjustment" on page 44.

■ Shutter Speed Display

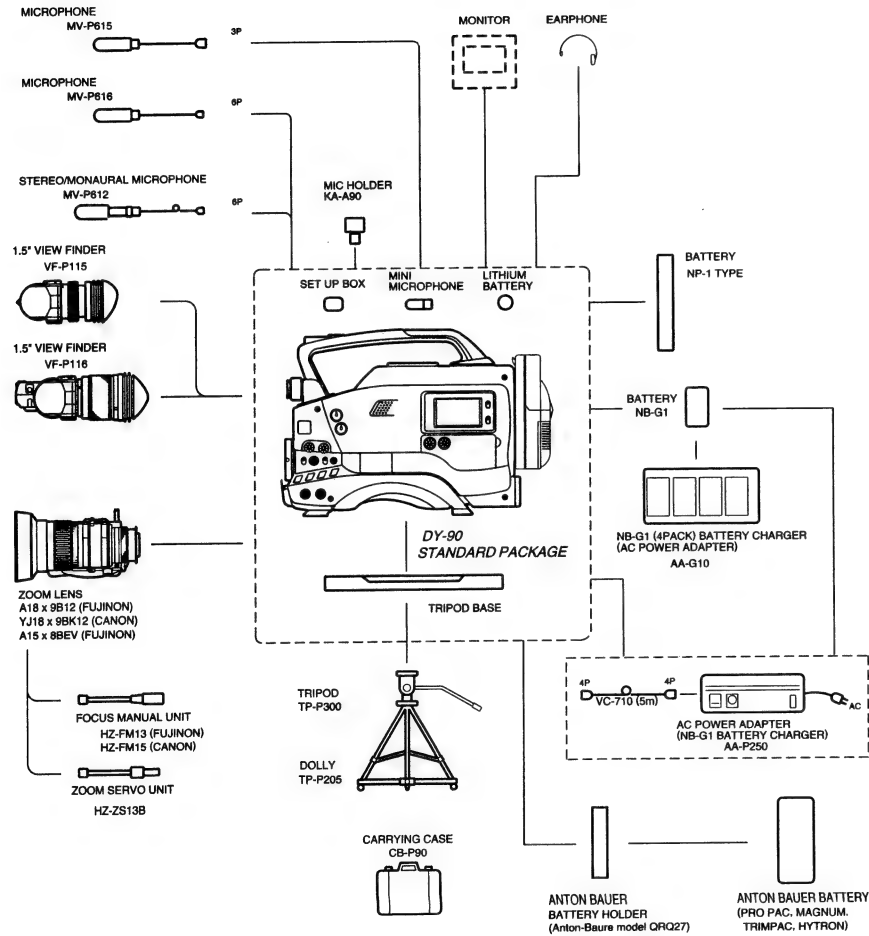


When the SHUTTER is on, a shutter speed is displayed. (for approx. 5 sec.)
Also, whenever the shutter speed is altered by using the UP/DOWN button, the shutter speed is displayed.
While this is displayed, other displays disappear.
See [SHUTTER] on page 14.

3. BASIC SYSTEM CONNECTIONS AND ADJUSTMENTS

3-1 Basic System (U-ver.)

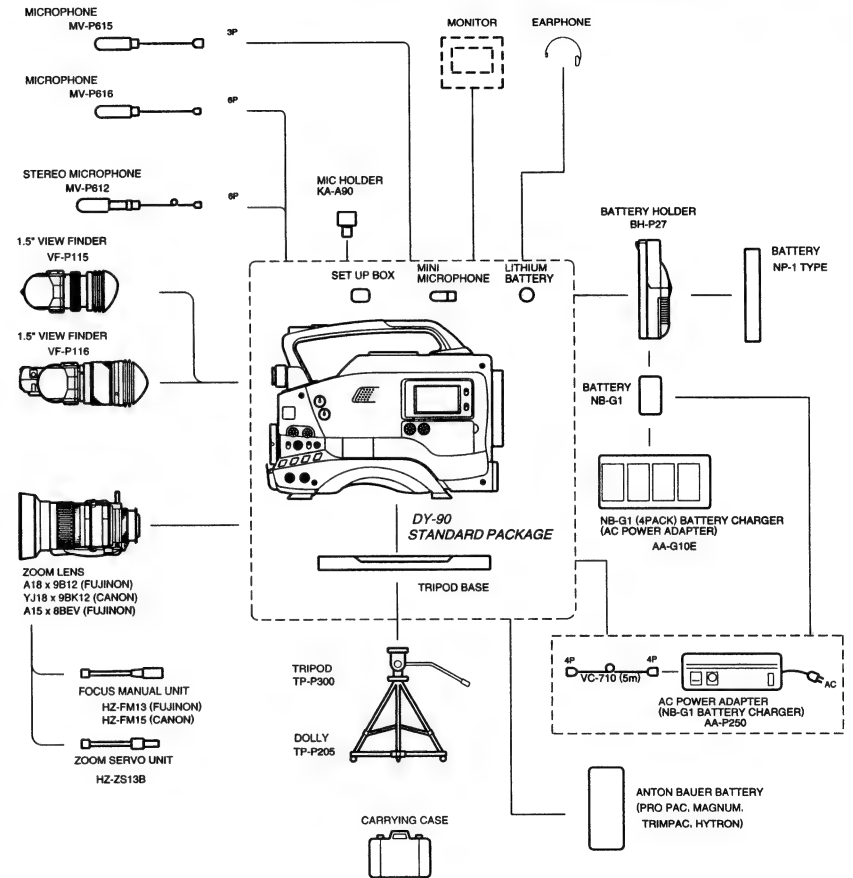
- For information on connection with the individual attachments, refer to the page describing the method for their respective connection.



3. BASIC SYSTEM CONNECTIONS AND ADJUSTMENTS

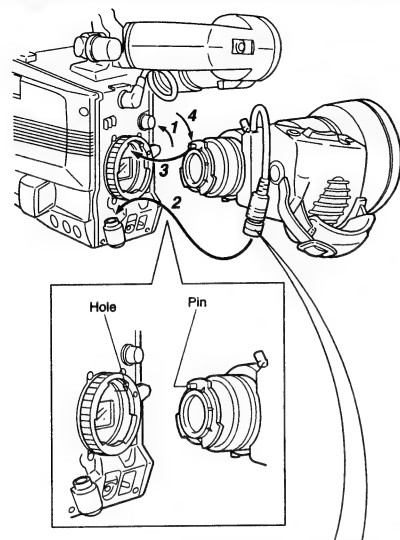
3-1 Basic System (E-ver.)

- For information on connection with the individual attachments, refer to the page describing the method for their respective connection.



3. BASIC SYSTEM CONNECTIONS AND ADJUSTMENTS

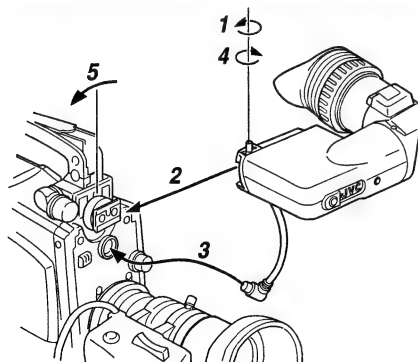
3-2 Attaching the Zoom Lens (optional)



When unplugging the cable, grasp this portion and pull up. If you have any difficulty, it may be better to remove the lens itself first. In this case, be careful not to drop the lens.

1. Loosen the mount ring.
2. Connect the cable.
3. Attach the lens with its pin aligned with the hole in the mount.
4. Tighten the mount ring.

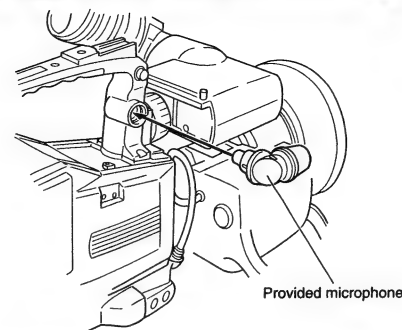
3-3 Attaching the Viewfinder (optional)



1. Loosen the stopper screw.
2. Attach the viewfinder with its guide aligned with the shoe.
3. Connect the cable.
4. Tighten the stopper screw.
5. Tighten the ring.

3. BASIC SYSTEM CONNECTIONS AND ADJUSTMENTS

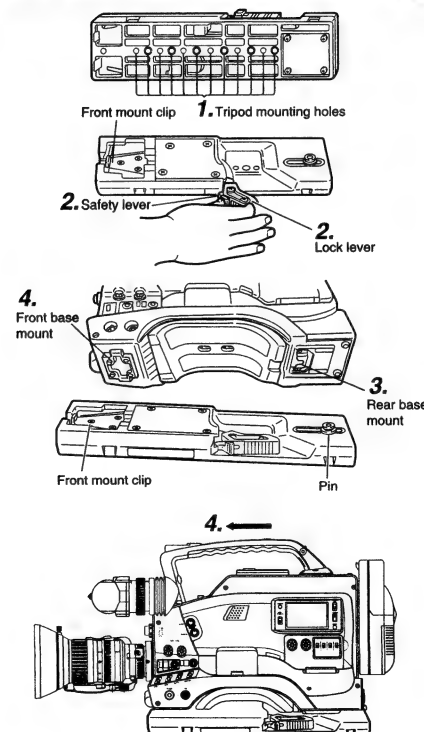
3-4 Attaching the Microphone



Connecting the provided microphone

Connect the provided microphone to the DA4(MIC1) connector (6-pin).

3-5 Attaching the Tripod Base



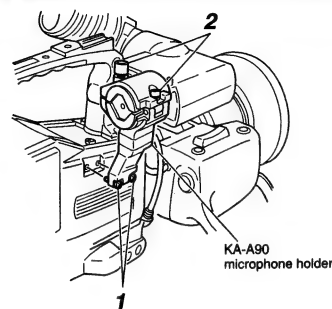
1. Attach the tripod base on the tripod by using the hole which balances the unit most optimally.
2. While pushing the safety lever, pull the lock lever toward the front until the front mount clip clicks into place.
3. Place the unit on the tripod base by aligning the rear base mount of the unit with the pin on the tripod base.
4. Push the unit from the upward direction and slide it toward the front so that the front base mount of the unit is locked by the front mount clip of the tripod base as it clicks into place.

CAUTION :

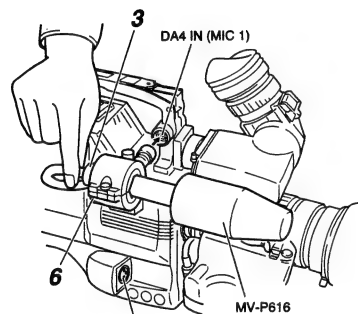
- The front base mount may be locked while the pin of the tripod base is not inserted into the hole on the rear base mount of the unit. Therefore, after mounting, make sure that these parts are engaged properly.
- When moving the unit which is mounted on a tripod, any impact or vibration should be avoided as this may cause the unit to become detached and to drop from the tripod. Be sure to remove the unit from the tripod before moving it.

3. BASIC SYSTEM CONNECTIONS AND ADJUSTMENTS

3-6 Attaching the Optional Microphone (U-ver.)



KA-A90
microphone holder



DA2 IN (MIC)

With the optional KA-A90 mic holder, the optional MV-P615/616 (mono) and MV-P612 (stereo/mono), microphones can be used.
* When using the MV-P612 microphone, set the DA4(MIC1) mode switch on the MV-P612 to "mono" (monaural).

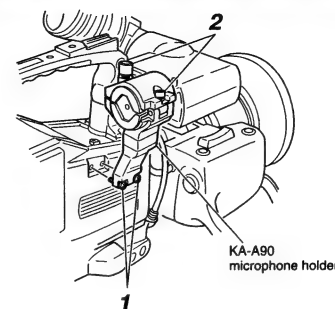
1. Secure the mic holder with 2 screws.
2. Turn the small knob located on the outer side of the mic holder anticlockwise to loosen it, and loosen the large knob located on the inner side in the same way. Rotate the large knob fully anticlockwise to open the holder.
3. Attach the microphone to the mic holder so that the microphone does not interfere with the cassette holder. With a stereo microphone, make sure that the left/right-sides are correct.
4. Set the mic holder so that the height is level, and tighten the inside and outside knobs to secure the microphone.
5. Connect the microphone cable to the mic input connector.
 - When the MV-P616/MV-P612 is used, connect the microphone's 6-pin connector to the DA4 input connector of this unit.
 - When the MV-P615 is used, connect the microphone's XLR 3-pin connector to the DA2 input connector of this unit. (Use only phantom microphone)
 - When the microphone is connected to DA1 or DA3 input connector on the rear panel, set the MIC +48 V ON switch according to the microphone used.
6. Secure the microphone cable using the cable clamp located on the side of the mic holder.

Note:

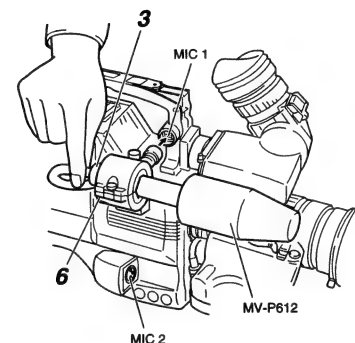
- When the light mounted on the camera is used at the same time, if the microphone in use has a long sound collecting section (ultra-directional type, etc.), the microphone's shadow may influence the image.
- When using a KA-A70 mic holder, noise may interfere with the audio signal. In this case, use a KA-A90 mic holder instead.
- When using the MV-P612 in the stereo mode, or the broad-directional microphone, noise of this unit may be picked up.

3. BASIC SYSTEM CONNECTIONS AND ADJUSTMENTS

3-6 Attaching the Optional Microphone (E-ver.)



KA-A90
microphone holder



MIC 2

With the optional KA-A90 mic holder, the optional MV-P615/616 (mono) and MV-P612 (stereo), microphones can be used.

1. Secure the mic holder with 2 screws.
2. Turn the small knob located on the outer side of the mic holder anticlockwise to loosen it, and loosen the large knob located on the inner side in the same way. Rotate the large knob fully anticlockwise to open the holder.
3. Attach the microphone to the mic holder so that the microphone does not interfere with the cassette holder. With a stereo microphone, make sure that the left/right-sides are correct.
4. Set the mic holder so that the height is level, and tighten the inside and outside knobs to secure the microphone.
5. Connect the microphone cable to the mic input connector.
 - When the MV-P616/MV-P612 is used, connect the microphone's 6-pin connector to the MIC1 connector of this unit.
 - When the MV-P615 is used, connect the microphone's XLR 3-pin connector to the MIC2 connector of this unit. (Use only phantom microphone)
 - When the microphone is connected to AUD1 or AUD2 connector on the rear panel, set the MIC +48 V ON switch according to the microphone used.
6. Secure the microphone cable using the cable clamp located on the side of the mic holder.

Note:

When the light mounted on the camera is used at the same time, if the microphone in use has a long sound collecting section (ultra-directional type, etc.), the microphone's shadow may influence the image.

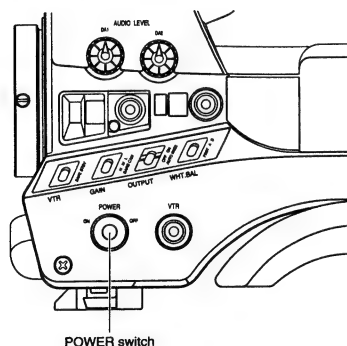
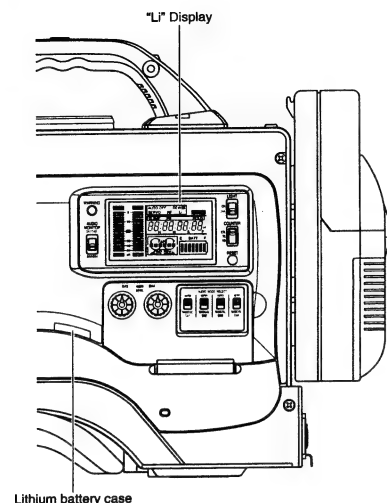
Note:

When using a KA-A70 mic holder, noise may interfere with the audio signal. In this case, use a KA-A90 mic holder instead.

3. BASIC SYSTEM CONNECTIONS AND ADJUSTMENTS

3-7 How to Replace Backup Lithium Batteries

This unit uses a lithium battery to backup the time code and date/time data.
Install the provided lithium battery before actually using the unit. (Lithium battery : CR2032)



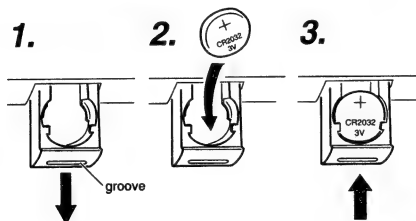
CAUTION

If the unit is not used for a lengthy period of time, remove the lithium battery. If the voltage of the lithium battery is low, the set may malfunction.

When the lithium battery is not in place or the battery is running down and requires a replacement, the "LI" in the LCD display will light up.

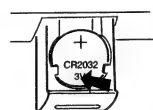
- Replace lithium batteries with the POWER switch set to ON. Doing it with the POWER switch set to OFF will cause the loss of backup data.

How to Install the Lithium Battery



1. Place a flat-blade screwdriver in the groove of the lithium battery case and lower it.
2. Slide the battery into place with its + marked surface facing upward.
3. Push the lithium battery case back into the unit.

How to Remove Lithium Batteries



- If you press the lithium battery at the shown place, it will easily be removed.

4. POWER SUPPLY (for U-ver.)

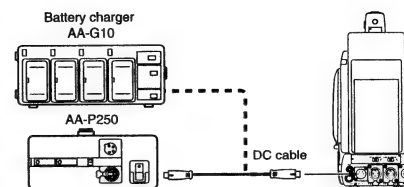
This unit is operable with the AC power supply or battery pack.

4-1 AC Operation

Note:
Do not remove or connect the DC cable while recording is being performed.

Use the JVC AA-G10 battery charger (max. rated output 4 A, 12 V DC) or AA-P250 battery charger (max. rated output 3.5A, 12.5 V DC) as the AC power supply.

- Do not use any power source with large fluctuations in the power source voltage as with ripples or other noise.



1. After making sure that the power switches of the DY-90 and of the AA-G10 or AA-P250 are set to OFF, connect the DC cable from the AA-G10 or AA-P250 to the DC INPUT connector of the DY-90 as shown in the illustration.
2. When the AA-P250 is used, set the CHARGE/CAMERA switch of the AA-P250 to CAMERA.
 - When the AA-G10 is used, press the VTR button of the AA-G10.
3. Press the POWER switch of the unit to ON. Now power is supplied to the unit.
 - For details, read the instruction manual of the AA-G10 or AA-P250.

4-2 Battery Pack Operation

This unit can be operated with the following battery packs.

- JVC battery pack : NB-G1
- Flat shape type battery pack
- Anton-Bauer battery pack
 - Propack 13/14 Series
 - Trimpack 13/14 Series

- Magnum 13/14 Series
- Compact 13/14 Series

- An Anton-Bauer battery pack cannot be attached to this unit directly.
An additional battery holder is required.
- Battery holder: Anton-Bauer model QRQ27
See page 37 for the battery holder attaching method.

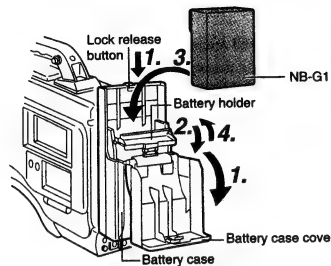
- When the DC cable is connected to the DC INPUT connector, the power supply from the battery pack is interrupted and the power starts to be supplied through the DC INPUT connector.
- The connection and disconnection of the DC cable should be performed quickly and correctly when operating with a battery pack.
The following symptoms may occur when connecting and disconnecting the DC cable too slowly when operating with a battery pack.
 - The power is cut off for a moment when the DC cable is disconnected.
 - Noise to the video and audio signals occurs. Audio signal becomes mute.
- When operation is carried out with a new battery DC input after the previously battery capacity has run out, switch OFF the power once then switch ON after the DC voltage is applied.

4. POWER SUPPLY (for U-ver.)

4-2 Battery Pack Operation (Cont'd)

USING JVC'S NB-G1 OR FLAT SHAPE TYPE BATTERY PACK

Attaching the NB-G1 Battery Pack

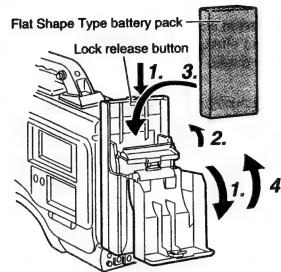


1. Open the battery case cover while pushing the lock release button.
2. Tilt the battery holder in the arrow-indicated direction.
3. Insert the battery pack into the battery case with its electrodes facing the unit.
4. Close the battery holder in the arrow-indicated direction and close the battery case cover.

Note:

Switch the power to OFF when replacing the battery pack.

Attaching a Flat Shape Type Battery Pack



1. Open the battery case cover while pushing the lock release button.
2. Tilt the battery holder in the arrow-indicated direction.
3. Insert the battery pack into the battery case with its electrodes facing the unit.
4. Close the battery case cover.

4. POWER SUPPLY (for U-ver.)

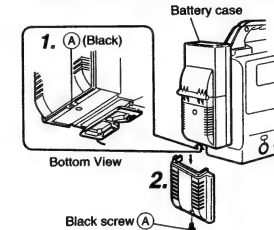
4-2 Battery Pack Operation (Cont'd)

ATTACHING AN ANTON-BAUER BATTERY PACK

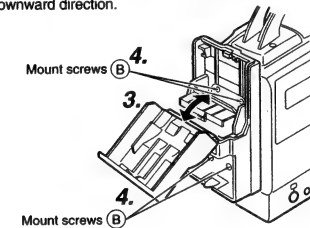
When an Anton-Bauer battery pack (Propack 13/14, Trimpack 13/14, Magnum 13/14, Compact 13/14 Series) is used, it is required to remove the battery case from this unit and attach the Anton-Bauer battery holder in place. Use the battery holder model described below.

• Battery holder : Anton-Bauer model QRQ27

Removing the Battery case from this unit and Attaching Anton-Bauer Battery Holder In Place

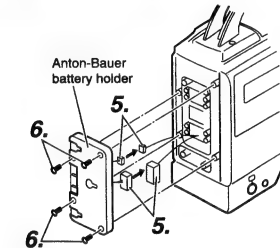


1. Remove the black screw (A) from the bottom of the battery case.
2. Remove the lower half of the battery case cover in the downward direction.



3. Open the battery cover and battery holder.
4. Remove the 4 mount screws (B), disconnect the connectors between this unit and the battery cover, and separate the battery case from this unit.

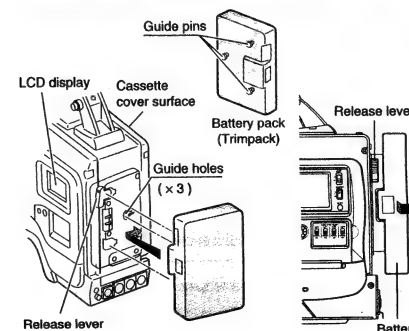
Attaching the Anton-Bauer battery holder



5. Connect the connectors from this unit and those of the battery holder (connect 2 pairs of connectors including the large and small ones).
6. Secure the battery holder onto this unit using the 4 mount screws supplied with the battery holder.

• Be careful not to pinch the connector wires; otherwise a malfunction may result.

USING AN ANTON-BAUER BATTERY PACK



Attaching the Battery Pack

1. Align the 3 guide pins of the battery pack with the guide holes on the battery holder, and push straight to insert the battery pack. The battery cannot be attached properly if the guide pins are not inserted straight.
2. Slide the battery pack toward the side panel where the cassette cover is located until it clicks.
→ Now the battery pack has been attached.

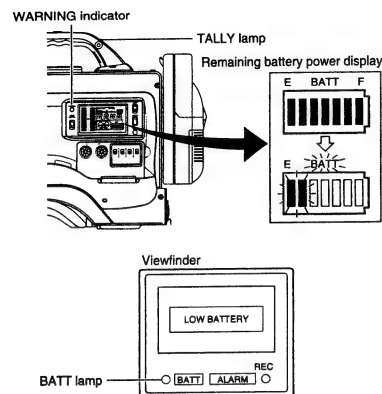
Detaching the Battery Pack

■ While pushing and holding the release lever, slide the battery pack toward the side panel where the LCD display is located, then pull the battery pack outward to remove.

4. POWER SUPPLY (for U-ver.)

4-2 Battery Pack Operation (Cont'd)

REMAINING BATTERY POWER DISPLAY



When an Anton-Bauer intelligent battery pack is used, the input voltage indicator section in the Status 1 mode of the viewfinder displays the remaining battery power in percentage (%) figures.

- To display the remaining battery power accurately, set the Setup Menu item "BATT. TYPE SELECT" according to the type of the battery pack in use. For details see page 64.

The status of the remaining battery power can be checked by the remaining battery power display. For details, see page 64.

- When the remaining battery power is nearly exhausted, the following warning message will appear. In this case, replace it with a fully-charged battery as soon as possible.
 - Remaining battery power display : Segment bar and BATT indicator starts to blink
 - WARNING indicator and TALLY lamp blink
 - Viewfinder : BATT lamp blinks "LOW BATTERY" character indication (Status 0 or Status 1 mode)
 - Alarm sound beeps

After the remaining battery power warning appears, if the battery power operation is still continued, this unit automatically stops operation.

Operating Time with Battery Pack

When the VF-P116 is used as the viewfinder and a fully charged battery pack is attached, the continuous operating time is as follows:

Battery Pack	Continuous Operating Time (at 25 °C)
NB-G1	40 Minutes
NP-1B	40 Minutes
Magnum 14	80 Minutes
Trimpack 14	50 Minutes

PRECAUTIONS FOR THE BATTERY PACK

- When the battery pack is not in use, it must be stored in a cool, dry place.
Do not leave the battery pack in a place where it might be subject to a high temperature (under direct sunlight in a car, etc.), this could cause leakage of the fluid or shorten service life.
- When the terminal section of the battery pack gets dirty, the operating time will be shortened.
- If the operating time becomes greatly reduced even immediately after recharging, the battery pack has nearly finished its service life. Purchase a new battery pack.

Recharging

- Recharge the battery pack after completely discharging. If recharging is repeated with incomplete discharging, this could cause lowering of the battery capacity.
- If the battery capacity is lowered by repeating incomplete recharging and discharging, once discharge the battery pack completely, then recharge it to regain the battery capacity.
- If the battery pack is recharged with its internal temperature raised immediately after use, recharging may not be performed completely.

4. POWER SUPPLY (for E-ver.)

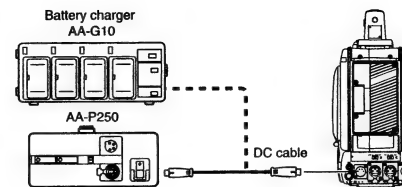
This unit is operable with the AC power supply or battery pack.

4-1 AC Operation

Note:
Do not remove or connect the DC cable while recording is being performed.

Use the JVC AA-G10 battery charger (max. rated output 4 A, 12 V DC) or AA-P250 battery charger (max. rated output 3.5A, 12.5 V DC) as the AC power supply.

- Do not use any power source with large fluctuations in the power source voltage as with ripples or other noise.



1. After making sure that the power switches of the DY-90 and of the AA-G10 or AA-P250 are set to OFF, connect the DC cable from the AA-G10 or AA-P250 to the DC INPUT connector of the DY-90 as shown in the illustration.
2. • When the AA-P250 is used, set the CHARGE/CAMERA switch to CAMERA.
• When the AA-G10 is used, press the VTR button.
3. Press the POWER switch of the unit to ON.
Now power is supplied to the unit.
• For details, read the instruction manual of the AA-G10 or AA-P250.

4-2 Battery Pack Operation

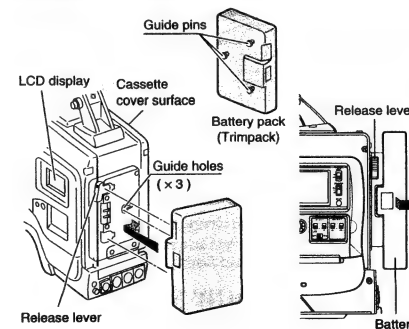
This unit can be operated with the following battery packs.

- Anton-Bauer battery pack Directly connect to the battery holder.
 - Propack 13/14 Series
 - Trimpack 13/14 Series
 - Magnum 13/14 Series
 - Compack 13/14 Series
- JVC battery pack : NB-G1
- Flat shape type battery pack

When the NB-G1 or a flat type battery pack is used, the optional battery case BH-P27 must be mounted to this unit. For details see page 36.

- When the DC cable is connected to the DC INPUT connector, the power supply from the battery pack is interrupted and the power starts to be supplied through the DC INPUT connector.
- The connection and disconnection of the DC cable should be performed quickly and correctly when operating with a battery pack.
The following symptoms may occur when connecting and disconnecting the DC cable too slowly when operating with a battery pack.
 - The power is cut off for a moment when the DC cable is disconnected.
 - Noise to the video and audio signals occurs. Audio signal becomes mute.
- When operation is carried out with a new battery DC input after the previously battery capacity has run out, switch OFF the power once then switch ON after the DC voltage is applied.

USING AN ANTON-BAUER BATTERY PACK



Attaching the Battery Pack

1. Align the 3 guide pins of the battery pack with the guide holes on the battery holder, and push straight to insert the battery pack.
The battery cannot be attached properly if the guide pins are not inserted straight.
2. Slide the battery pack toward the side panel where the cassette cover is located until it clicks.
→ Now the battery pack has been attached.

Detaching the Battery Pack

- While pushing and holding the release lever, slide the battery pack toward the side panel where the LCD display is located, then pull the battery pack outward to remove.

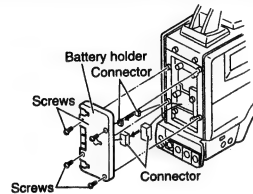
4. POWER SUPPLY (for E-ver.)

4-2 Battery Pack Operation (Cont'd)

USING JVC'S NB-G1 OR FLAT TYPE BATTERY PACK

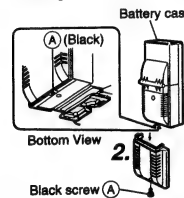
When JVC's NB-G1 battery pack or flat type battery pack is used, it is required to remove the battery holder of the DY-90 and the optional battery case (BH-P27) must be mounted.

Removing the Battery Holder and Attaching the BH-P27 Battery Case (optional)

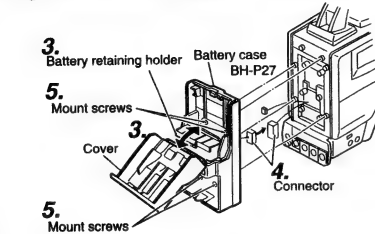


1. Remove the four screws fixing the battery holder and the two connectors (large, small) retaining the battery holder to this unit to remove the battery holder.

Attaching the BH-P27 battery case

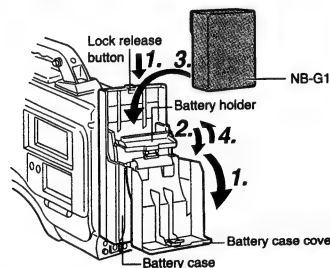


2. Remove the black screw (A) on the bottom of the battery case, and remove the lower half of the battery case cover in the downward direction.



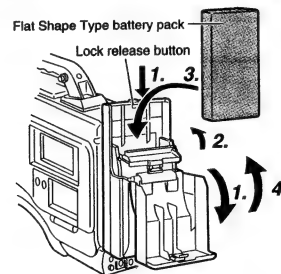
3. Open the battery case cover and the battery retaining holder.
4. Connect the battery case connector to the large connector of this unit.
5. Using the four fixing screws provided with the battery case, mount the battery case to this unit.
6. Secure the lower cover removed in step 2, using the black screw (A).

Attaching the NB-G1 Battery Pack



1. Open the battery case cover while pushing the lock release button.
2. Tilt the battery holder in the arrow-indicated direction.
3. Insert the battery pack into the battery case with its electrodes facing the unit.
4. Close the battery holder in the arrow-indicated direction and close the battery case cover.

Attaching a Flat Shape Type Battery Pack

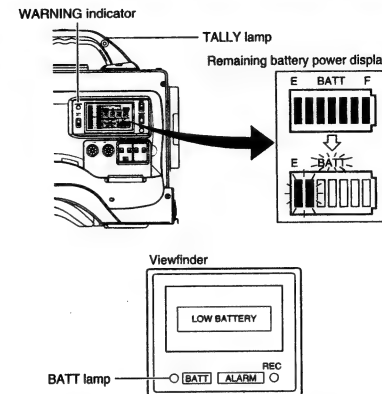


1. Open the battery case cover while pushing the lock release button.
2. Tilt the battery holder in the arrow-indicated direction.
3. Insert the battery pack into the battery case with its electrodes facing the unit.
4. Close the battery case cover.

4. POWER SUPPLY (for E-ver.)

4-2 Battery Pack Operation (Cont'd)

REMAINING BATTERY POWER DISPLAY



- To display the remaining battery power accurately, set the Setup Menu item "BATT. TYPE SELECT" according to the type of the battery pack in use. For details see page 64.

The status of the remaining battery power can be checked by the remaining battery power display. For details, see page 64.

When the remaining battery power is nearly exhausted, the following warning message will appear. In this case, replace it with a fully-charged battery as soon as possible.

- Remaining battery power display : Segment bar and BATT indicator starts to blink
- WARNING indicator and TALLY lamp blink
- Viewfinder : BATT lamp blinks "LOW BATTERY" character indication (Status 0 or Status 1 mode)
- Alarm sound beeps

After the remaining battery power warning appears, if the battery power operation is still continued, this unit automatically stops operation.

When an Anton-Bauer intelligent battery pack is used, the input voltage indicator section in the Status 1 mode of the viewfinder displays the remaining battery power in percentage (%) figures.

Operating Time with Battery Pack

When the VF-P116 is used as the viewfinder and a fully charged battery pack is attached, the continuous operating time is as follows:

Battery Pack	Continuous Operating Time (at 25 °C)
Magnum 14	80 Minutes
Trimpack 14	50 Minutes
NB-G1	40 Minutes
NP-1B	40 Minutes

- Battery operating time may differ depending on the number of charging times of the battery, charging conditions and the operating environment, etc. Use the values in the table on the left for approximate reference times.

- Operating time is reduced in areas with a cold environment.
- Operating time is reduced when the powered zoom lens is used frequently.

PRECAUTIONS FOR THE BATTERY PACK

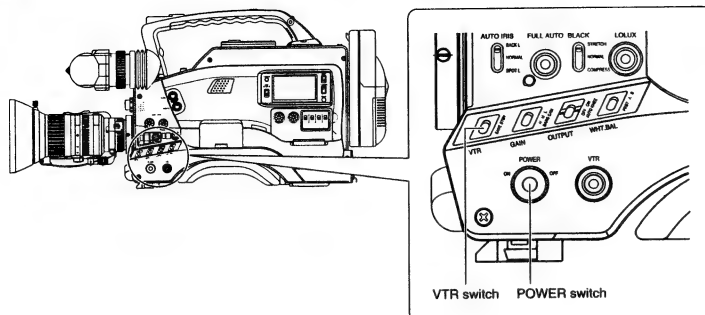
- When the battery pack is not in use, it must be stored in a cool, dry place. Do not leave the battery pack in a place where it might be subject to a high temperature (under direct sunlight in a car, etc.), this could cause leakage of the fluid or shorten service life.
- When the terminal section of the battery pack gets dirty, the operating time will be shortened.
- If the operating time becomes greatly reduced even immediately after recharging, the battery pack has nearly finished its service life. Purchase a new battery pack.

Recharging

- Recharge the battery pack after completely discharging. If recharging is repeated with incomplete discharging, this could cause lowering of the battery capacity.
- If the battery capacity is lowered by repeating incomplete recharging and discharging, once discharge the battery pack completely, then recharge it to regain the battery capacity.
- If the battery pack is recharged with its internal temperature raised immediately after use, recharging may not be performed completely.

5. PREPARATIONS

5-1 Turning the Power ON

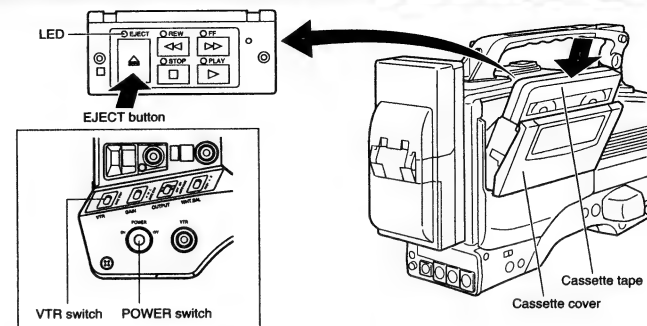


1. Turn the POWER switch to ON.
→ The power is then supplied to the unit.
• Video image is output to the viewfinder.
• The display of the VCR section is turned on.
2. Select the DY-90 operation mode with the VTR switch.
• The DY-90 operation mode may differ when the power is turned ON or when the cassette is loaded depending on the setting of the VTR switch as follows:

VTR switch setting	DY-90 operation mode
SAVE	DY-90 enters the SAVE mode (tape protect mode) and stops the drum motor. "SAVE" is displayed in the VCR operation display section in the Status 1 mode of the viewfinder. In this mode, the tape is effectively protected. In this condition, press the VTR trigger button to start recording. However, the time required for this operation takes more than for that of the STBY mode.
STBY	When a recordable cassette tape is loaded, the DY-90 enters the record-pause mode automatically. (the Drum motor is still rotating.) "STBY" is displayed on the Status 1 screen on the viewfinder. In this condition, pressing the VTR trigger button immediately starts recording.

5. PREPARATIONS

5-2 Cassette Loading and Unloading



- A cassette cannot be loaded in or unloaded from the unit while it is in POWER OFF mode.
- Use a video cassette tape marked DIGITAL S.
- A S-VHS or VHS video cassette tape cannot be used with this unit. If you insert a S-VHS or VHS cassette in the unit, it will be ejected automatically.

Loading the Cassette

1. Turn the POWER switch to ON.
2. Press the EJECT button to open the cassette cover.
The LED indicator above the EJECT button lights and the cassette cover opens.
3. Insert a cassette tape after removing the tape slack.
4. Slowly close the cassette cover by pushing it in all the way.
The tape is loaded automatically when the cassette cover is closed.




The cassette indicator on the display blinks during tape loading and lights steadily after the loading has been completed.

- The condition at the completion of loading is variable depending on the VTR switch and the REC switch on the back side of the cassette tape as shown below.

VTR switch	REC switch of Cassette Tape	
	ON	OFF
VTR STBY	Enters record-pause mode after back-spacing.	The unit enters stop mode.
SAVE	In the record-pause mode the drum rotation is stopped.	

- After the cassette cover is closed, it takes about 8 seconds before the unit can start recording or enter the stop mode.

CAUTION

When closing the cassette cover, be sure to push it in all the way. When the cassette cover is not closed completely, it is left in a half-locked state, in which the VCR section accepts no operation. In this case, push the cover again all the way to get it locked firmly. When the cassette is in place and the cassette cover is only half-locked, the  cassette indicator in the LCD display will not appear. When the cassette cover is properly locked, the indicator is displayed.

Unloading the Cassette

1. Turn the POWER switch to ON.
2. Press the EJECT button.
→ The LED indicator above the EJECT button lights and tape ejection starts.



- It takes a few seconds before the cassette cover opens after the EJECT button is pressed.
- The cassette tape cannot be ejected during recording. Allow the unit to enter the record-pause mode first before pressing the EJECT button.

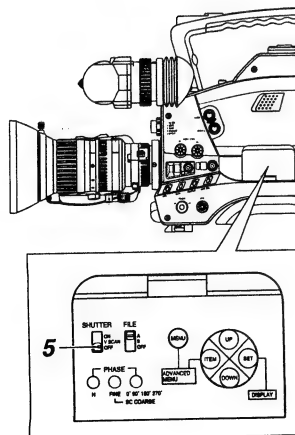
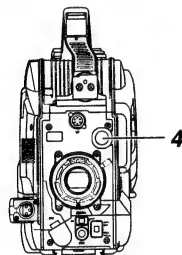
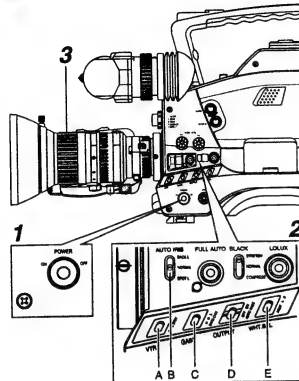
3. Take out the cassette tape.
4. Close the cassette cover.

CAUTION

Do not leave the unit for a long period with the cassette cover open.
Otherwise dirt or other foreign objects may enter the VCR section, and cause malfunction.

6. SETTING AND ADJUSTMENTS BEFORE SHOOTING

6-1 Camera Control Settings for Adjustment



1. POWER ON

1. First place a charged battery in the battery holder or connect DC power to the DC input.
2. Turn the AC power adapter on.
3. Set the POWER switch on the unit to ON.

2. Side SWITCH positions

- A. Turn the VTR switch to the SAVE.
- B. AUTO IRIS switch; set to NORMAL.
- C. GAIN switch; set to L. The L position is always 0 dB.
- D. OUTPUT (CAM/BARS) switch; set to CAM•AUTO KNEE OFF.
- E. WHT. BAL (Auto White Balance) switch; set to A or B.

3. AUTO IRIS ON

Initially set the lens iris to Automatic. (A mode)
Later take advantage of the Momentary Iris control to activate the camera's exposure system when needed.

4. FILTER turret

Choose the proper Filter selection for the lighting conditions.
•U-ver.

FILTER	Suitable Location
1 3200K	Indoor, dark outdoors
2 5600K	Outdoors
3 5600K+ND	Outdoor under fine weather
4 EFFECT	The cross effect filter makes the highlight sections shine like crosses and reduces the contrast. The corresponding color temperature is 3200K.

•E-ver.

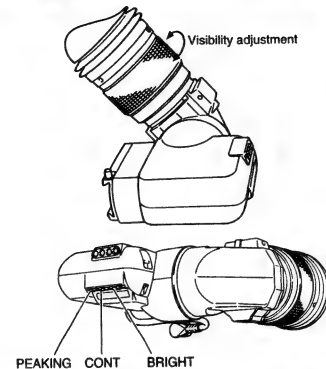
FILTER	Suitable Location
1 3200K	Indoor, dark outdoors
2 5600K+1/4ND	Outdoors under fine weather
3 5600K	Outdoors
4 5600K+1/16ND	Outdoor under fine weather

5. SHUTTER positions

Set to OFF position.

6. SETTING AND ADJUSTMENTS BEFORE SHOOTING

6-2 Viewfinder Adjustment



■ Visibility adjustment

Rotate the eyepiece focusing ring so that the viewfinder screen image is clearly visible.

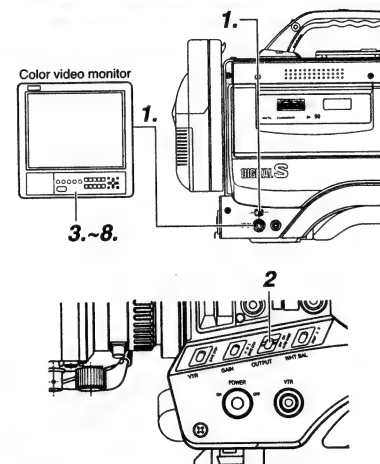
■ Brightness and contrast adjustment

When the ambient brightness changes, the brightness and contrast of the viewfinder screen can be adjusted with the CONT and BRIGHT controls.

■ Peaking adjustment

Turning the PEAKING (contour adjustment) control makes the picture look sharper, making focus adjustment easier.

6-3 External Monitor Adjustment (U-ver.)



Display the color bar signal built in the camera head and adjust the colors, contrast and brightness.

1. Connect a color video monitor to the MONITOR OUTPUT connector of the camera head. Set the switch to the CAM side of the [CAM/VTR] switch of this unit.
2. Set the OUTPUT switch to BARS to output the color bar signal (SMPTE type color bars).
3. Set the monitor so that the screen turns entirely blue.
4. Adjust the chroma control of the monitor so that there is no difference in brightness between ① and ⑨ or between ⑦ and ⑮ of the color bars.
5. Adjust the phase control of the monitor so that there is no difference in brightness between ③ and ⑮ or between ⑤ and ⑮ of the color bars.
6. If the phase control adjustment above causes a difference in brightness between ① and ⑨ or between ⑦ and ⑮, restart from the chroma control adjustment in step 4.
7. Switch the monitor back to the standard screen (All of R, G and B will appear).
8. Adjust the brightness by using the Brightness Adjusting control so that the color bar ⑮ and ⑮ disappear, and color bar ⑮ becomes visible.

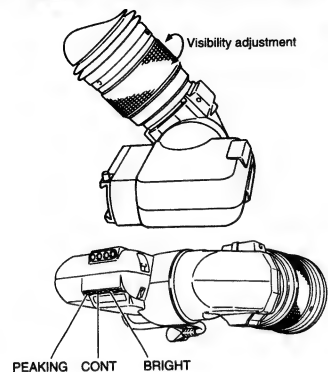
■ SMPTE type color bars

White ①	Yellow ②	Cyan ③	Green ④	Magenta ⑤	Red ⑥	Blue ⑦
Blue ⑧	Black ⑨	Magenta ⑩	Black ⑪	Cyan ⑫	Black ⑬	White ⑭
Blue ⑮	Blue ⑯	Blue ⑰	Blue ⑱	Blue ⑲	Blue ⑲	Blue ⑲

The color bar screen has a configuration as shown above.
The description hereinafter refers to the positions in the color bar screen using the numbers.

6. SETTING AND ADJUSTMENTS BEFORE SHOOTING

6-2 Viewfinder Adjustment



■ Visibility adjustment

Rotate the eyepiece focusing ring so that the viewfinder screen image is clearly visible.

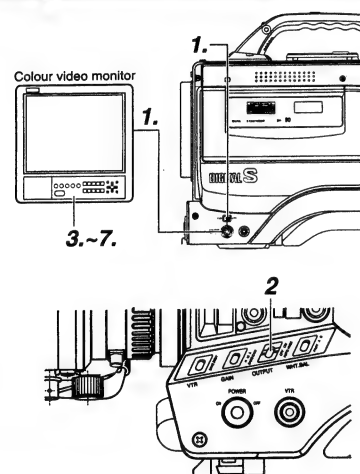
■ Brightness and contrast adjustment

When the ambient brightness changes, the brightness and contrast of the viewfinder screen can be adjusted with the CONT and BRIGHT controls.

■ Peaking adjustment

Turning the PEAKING (contour adjustment) control makes the picture look sharper, making focus adjustment easier.

6-3 External Monitor Adjustment (E-ver.)



■ EBU type colour bars

White	Yellow	Cyan	Green	Magenta	Red	Blue	Black
①	②	③	④	⑤	⑥	⑦	⑧

The colour bar screen has a configuration as shown above. The description hereinafter refers to the positions in the colour bar screen using the numbers.

Display the colour bar signal built in the camera head and adjust the colours, contrast and brightness.

1. Connect a colour video monitor to the MONITOR OUTPUT connector of the camera head. Set the switch to the CAM side of the [CAM/VTR] switch of this unit.

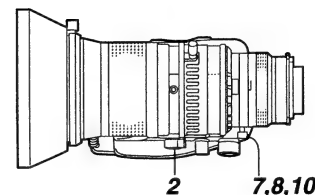
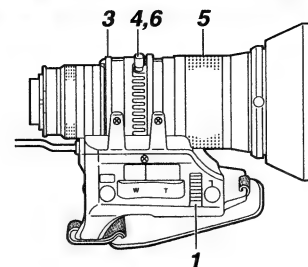
— Note : —

Make sure that the monitor is terminated with 75 Ω before connecting the MONITOR OUTPUT connector. If it is not terminated with 75 Ω the video signal will not output when the power is on because of the power saving features equipped with this unit.

2. Set the OUTPUT switch to COLOUR BARS to output the colour bar signal (EBU type colour bars).
3. Set the monitor so that the screen turns entirely blue.
4. Adjust the chroma control of the monitor so that there is no difference in brightness between ① and ⑦ of the colour bars.
5. Adjust the phase control of the monitor so that there is no difference in brightness between ③ and ⑤ of the colour bars.
6. If the phase control adjustment above causes a difference in brightness between ① and ⑦, restart from the chroma control adjustment in step 4.
7. Switch the monitor back to the standard screen (All of R, G and B will appear).

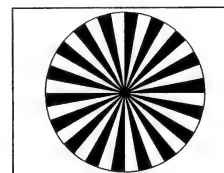
6. SETTING AND ADJUSTMENTS BEFORE SHOOTING

6-4 Back Focus Adjustment



It is only necessary to perform this when focusing is not correct in both the Telephoto and Wide-angle positions, such as when the lens is attached for the first time. Adjust the viewfinder for sharpness first. It is easier to adjust back focus when the subject is more than 3 meters from the subject.

1. Set the Iris mode to M (Manual).
2. Set the Zoom mode to MANU (Manual).
3. Open the Iris ring to F1.4. If the illumination is too strong, reduce it or move to a darker place.
4. Turn the zoom lever until the lens is completely telephoto.
5. Focus on the subject. There is a specific chart that looks like a dart board which is helpful.
6. Set the lens to completely Wide-angle.
7. Loosen the back focus ring retaining knob.
8. Adjust the back focus ring for the best possible focus.
9. Repeat steps 4 through 8 for fine adjustment.
10. Tighten the back focus ring retaining knob to secure the ring.



6. SETTING AND ADJUSTMENTS BEFORE SHOOTING

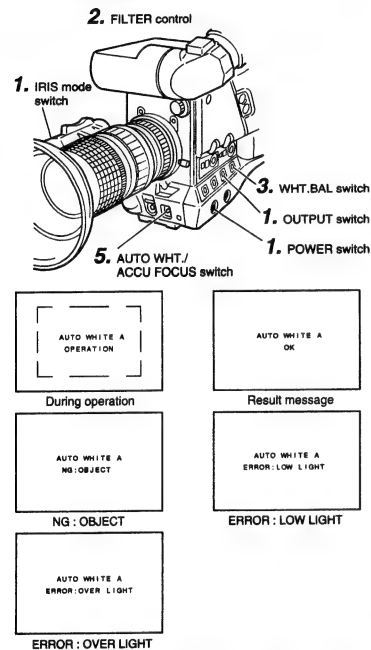
6-5 White Balance Adjustment

Since the color of light (color temperature) is variable depending on the light source, it is required to re-adjust the white balance when the main light source illuminating the object changes.

Note

- Do not place any objects such as metal one, etc. that can produce a strong reflected light as this may cause an improper white balance adjustment.
- When an object lit by a halogen lamp of which the color temperature is 3,200K is shot while using a the color temperature conversion filter set to 5,600K, a proper white balance adjustment and (FAW) Full Time Auto White balance cannot be carried out. In this case, change the setting of the color temperature conversion filter to 3,200K then carry out the white balance adjustment and (FAW) again.

WHITE BALANCE ADJUSTMENT



Two kinds of white balance adjustment results can be stored in memories A and B.

Adjustment procedure

- Set the following switches.
 - Set the POWER switch to ON.
 - Set the OUTPUT switch to CAM-AUTO KNEE OFF.
 - Set the IRIS mode switch of the lens to A (Auto).
- Set the FILTER control according to the current lighting.
- Set the WHT.BAL switch to A or B.
- Place a white object near the center of the screen under the same lighting conditions as the target object and zoom in to fill the screen with white.
- Tilt the AUTO WHT./ACCU FOCUS switch upward (to AUTO WHITE) once and release it.
 - "AUTO WHITE A, B OPERATION" is displayed on the viewfinder screen during the operation of the auto white balance adjustment circuit.
 - "AUTO WHITE A, B OK" is displayed when the white balance has been adjusted properly.

[Error messages]

- NG : OBJECT
Displayed when there is not enough white color on an object or the color temperature is not suitable.
- ERROR : LOW LIGHT
Displayed when the light is low. Increase the lighting illumination then re-adjust the white balance.
- ERROR : OVER LIGHT
Displayed when the light is excessively bright. Decrease the lighting illumination then re-adjust the white balance.

FULL-TIME AUTO WHITE BALANCE (FAW)

The FAW function adjusts the white balance value automatically as the lighting condition changes.

This mode is convenient when you have no time to adjust the white balance or when the camera is moved frequently in and out of places under different lighting conditions.

Setting procedure

The FAW function can be activated with item "FAW" on the ADVANCED MENU.

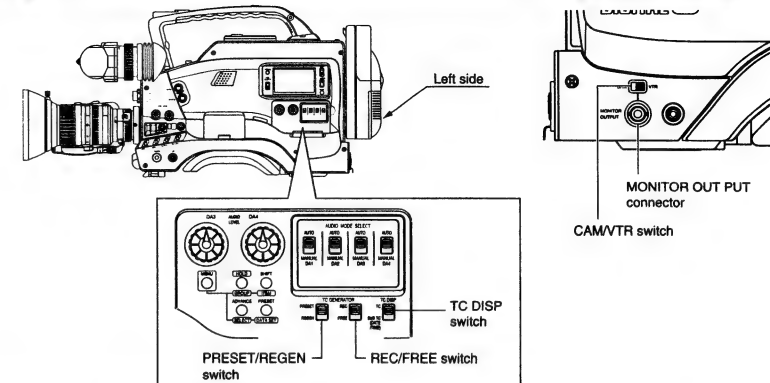
This item allows setting of the FAW function to one of the white balance switches, A, B or PRESET. Select "NONE" if the FAW function is not required. See page 69.

CAUTION :

- The FAW (Full-time Auto White balance) function cannot provide optimum white balance with an object outside the FAW adjustment range, for example when it contains only a single color or not enough white color.
- The accuracy of the FAW (Full-time Auto White balance) is inferior to that of the manual white balance.
- When the power is switched ON in the FAW mode, it will take approximately 10 seconds for the FAW to complete automatic adjustment. Do not perform any recording during these few seconds.

6. SETTING AND ADJUSTMENTS BEFORE SHOOTING

6-6 Switch Settings of the VCR Section (U-ver.)



PCM Audio recording channel

The DY-90 records 4 channels of audio signals to the PCM audio channels.

According to the audio input connectors (DA1 - DA4 IN), it records to each PCM audio channel (DA1 - DA4). See page 46.

Audio input signal selection

Select with the [LINE/MIC] switch for the audio input when recording the audio signal of the [DA1 IN] or [DA3 IN] connectors on the rear panel. See page 46.

Recording level adjustment selection

Select the recording level adjustment "AUTO" or "MANUAL" for each audio input connector separately. (See page 47.)

Video output signal selection

Select the video signals from the viewfinder and monitor connector with the [CAM/VTR] switch.

CAM : Regardless of which mode, the EE image from the camera video signal is output.

Set to this position to shoot the image for back up use with the VCR connecting to the MONITOR OUTPUT connector.

VTR : The playback picture is output during the playback mode.

The EE image from the camera is output during other modes except PLAY mode. Set it to this position for ordinary use.

VCR setup menu setting

- AUDIO LOW CUT SELECT (DA1 TO DA4)
Select whether the lower frequency components of the audio signal is attenuated or not for each audio input signal. Set to "ON" when eliminating the wind noise of the microphone.
- LONG PAUSE TIME SELECT
Select the time (in minutes) until the DY-90 enters the tape protection mode (drum rotation stops) when the record-pause mode is continued for long time.
- BACK SPACE MODE SELECT
Select an image to be viewed in the viewfinder or monitor during backspacing in the Record-pause mode. [Effective only when the [CAM/VTR] switch is set to "VTR".]

For details of setup menu, see page 64.

Setting the time code recording function

The unit records SMPTE-standard time code during recording. Set the switches in the TC GENERATOR block according to applications.

- To record a time code as set in the built-in time code generator:
 - Set the PRESET/REGEN switch to PRESET.
 - Set the REC/FREE switch.
 - If it is required to record continual time codes across different scenes, set the switch to REC.
 - Set the VCR setup menu. Open the setup item "TCG SELECT DROP/NON-DROP" and set the framing mode of the time code generator to drop frame or non-drop frame mode.
- To record a time code in continuation from the existing time code on tape:
 - Set the PRESET/REGEN switch to REGEN.
- When recording the time code slave-locked to the external time code generator.
 - Set the PRESET/REGEN switch to PRESET.
 - Set the REC/FREE switch to FREE.
 - Setting the "U-BIT SLAVE ON/OFF" switch in the setup menu mode: Set to ON when the user's bit is also slave-locked at the same time.

The time taken to enter record mode from record-pause mode is variable depending on the PRESET/REGEN switch position.

When set to PRESET : Approx. 0.8 second
When set to REGEN : Approx. 1.5 second

This switching will cause a shift in the tape position for the REC PAUSE. Therefore, the unit generates a switching sound. When the PRESET/REGEN switch is switched after having started recording by pressing the VTR trigger button of the camera, the new setting remains valid in subsequent recording operations.

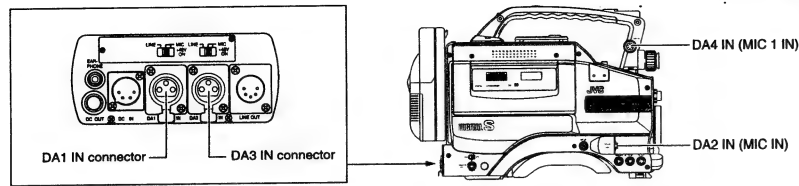
For details on the time code operations including time code presetting, see "TIME CODE OPERATION" on page 55.

The sub-time code is used to record the date and time data.

For the setting of the date and time data, see page 61.

6. SETTING AND ADJUSTMENTS BEFORE SHOOTING

6-7 PCM audio recording channels for audio input signals (U-ver.)



The DY-90 is equipped with 4 audio input connectors (DA1 IN - DA4 IN) to record 4 channels of audio signals. As shown in the list below, the signals from each of the audio input connectors (DA1 IN - DA4 IN) are respectively recorded on each of the PCM audio channels (DA1 - DA4) of the tape.

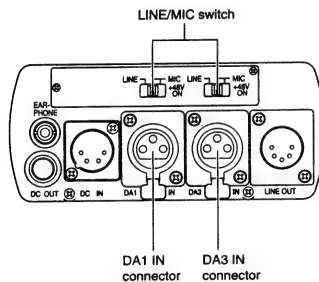
PCM Audio Recording Channel			
DA1	DA2	DA3	DA4
DA1 IN Connector	DA2 IN (MIC IN) Connector	DA3 IN Connector	DA4 IN (MIC 1 IN) Connector

- The sound on the DA1/DA2 or DA3/DA4 channels is output during playback.(can be selected with the AUDIO MONITOR switch)
- The audio signals of the DA1 IN and DA2 IN connectors are only recorded on the linear track of the tape for audio search.

Note :

When the tape is in playback with the BR-D80U, BR-D40U or BR-D750U series, etc. which are not compatible with 4-channel audio signal output, the sound of the DA1 and DA2 channels only are output.

6-8 Audio Input Signal Selection (U-ver.)



■ Selection of Rear Audio Input Connectors

Select the audio signal input to the AUDIO INPUT connector using the LINE/MIC switch. Set for DA1 IN and DA3 IN connectors separately.

- LINE** : Set to this position when connected to audio equipment, etc.
The reference input level is +4 dBs.
- MIC** : Set to this position when using the monaural microphone.
The reference input level is -60 dBs.
- MIC +48 V** : Set to this position when a microphone requiring +48 V DC power supply is connected. (Such as JVC MV-P615.)

■ DA4 (MIC 1) IN Connector

Connect a monaural microphone to the DA4 (MIC 1) IN connector.

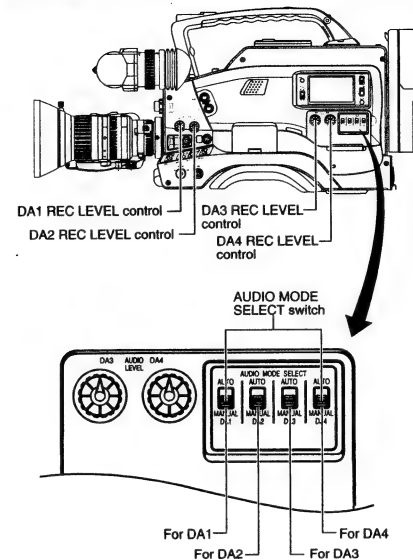
When a stereo microphone is connected, the sound on the L channel only is recorded.

Compatible JVC microphones are:

- MV-P616 (Monaural)
- MV-P612 (Stereo/Monaural): Set the microphone mode switch to "Monaural".

6. SETTING AND ADJUSTMENTS BEFORE SHOOTING

6-9 Recording Level Adjustment (U-ver.)



Either auto (fixed) or manual mode of the recording level adjustment can be selected for the audio signal at each audio input connector.

The recording level adjustment mode for each audio input connector DA1 - DA4 is selected with the AUDIO MODE SELECT switch.

■ Setting the AUDIO MODE SELECT Switch

- AUTO** : Recording level is fixed in this mode.
When the audio input exceeds the reference input level, the recording level is adjusted to the reference level.
However, even when the input level is lower than the reference input level, the recording level will not be increased.
The recording level volume cannot be controlled.
- MANUAL** : The recording level for DA1 - DA4 can be adjusted with the Rec. level control. (See below)

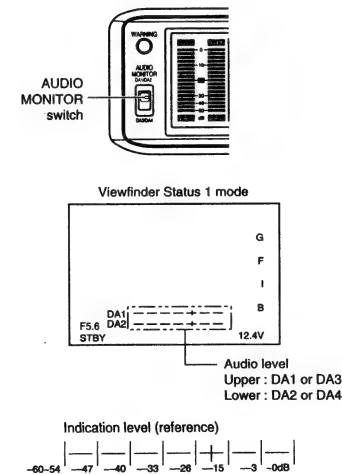
■ Manual Recording Level Adjustment

Recording level can be adjusted manually when the DY-90 is in the record, record-pause or stop mode.

1. Set the AUDIO MODE SELECT switch to "MANUAL" according to the input signal to be manually adjusted.
2. Select the audio level meter display mode for the display and viewfinder (DA1/DA2 or DA3/DA4 indication) using the AUDIO MONITOR switch.
3. Rotate the Rec level control corresponding to the required audio input, to be adjusted.
 - Adjust so that the peak level does not exceed the -3dB point when the loud sound is input.
 - With microphone input, since the limiter circuit is activated, the recording level does not exceed 0 dB even if the Rec level control is turned up.

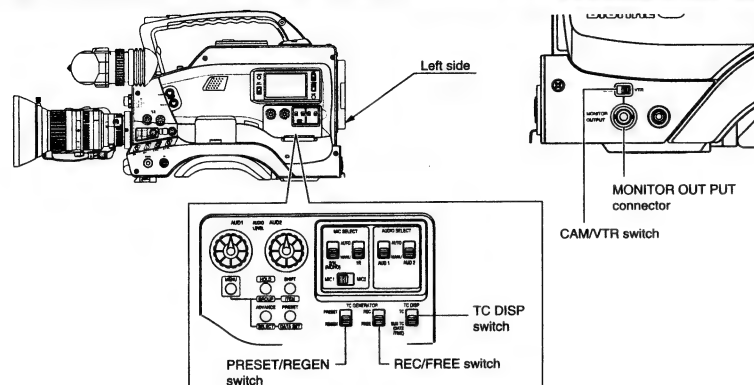
Note :

When the DA1 or DA3 INPUT LINE/MIC switch on the rear panel is set to "MIC", be sure to check that the microphone is connected to the DA1 or DA3 INPUT connector. If the microphone is not connected, increasing the recording level could cause the noise from the input connector to be recorded on the tape. When the microphone is not connected to the DA1 or DA3 INPUT connector on the rear panel, set the LINE/MIC switch to "LINE" or lower the Rec level control.



6. SETTING AND ADJUSTMENTS BEFORE SHOOTING

6-6 Switch Settings of the VCR Section (E-ver.)



Audio input signal selection

Select the audio signal for the microphone connector on the front panel or the AUDIO INPUT connector on the rear panel with the AUDIO SELECT switches. (See : page 45.)

PCM audio channel distribution for audio input signal

Confirm the channel distribution of the audio input signal onto the four PCM audio channels (DA1 - DA4). (See page 46.)

Recording level adjustment selection

Select the recording level adjustment "AUTO" or "MANUAL" for each audio input connector separately. (See page 47.)

Video output signal selection

Select the video signals from the viewfinder and monitor connector with the [CAM/VTR] switch.

CAM : Regardless of which mode, the EE image from the camera video signal is output.

Set to this position to shoot the image for back up use with the VCR connecting to the MONITOR OUTPUT connector.

VTR : The playback picture is output during the playback mode.

The EE image from the camera is output during other modes except PLAY mode. Set it to this position for ordinary use.

VCR setup menu setting

AUDIO LOW CUT FRONT/AUDIO LOW CUT REAR

Select whether the lower frequency components of the audio signal is attenuated or not for each audio input signal. Set to this position when eliminating the wind noise of the microphone.

LONG PAUSE TIME SELECT

Select the time (in minutes) until the DY-90 enters the tape protection mode (drum rotation stops) when the record-pause mode is continued for long time.

BACK SPACE MODE SELECT

Select an image to be viewed in the viewfinder or monitor during backspacing in the Record-pause mode. (Effective only when the [CAM/VTR] switch is set to "VTR".)

For details of setup menu, see page 64.

Setting the time code recording function

The unit records EBU-standard time code during recording. Set the switches in the TC GENERATOR block according to applications.

- To record a time code as set in the built-in time code generator:
 - Set the PRESET/REGEN switch to PRESET.
 - Set the REC/FREE switch.

If it is required to record continual time codes across different scenes, set the switch to REC.

- To record a time code in continuation from the existing time code on tape:
 - Set the PRESET/REGEN switch to REGEN.

- When recording the time code slave-locked to the external time code generator:
 - Set the PRESET/REGEN switch to PRESET.
 - Set the REC/FREE switch to FREE.

- Setting the "U-BIT SLAVE ON/OFF" switch in the setup menu mode: Set to ON when the user's bit is also slave-locked at the same time.

The time taken to enter record mode from record-pause mode is variable depending on the PRESET/REGEN switch position.

When set to PRESET : Approx. 0.8 second

When set to REGEN : Approx. 1.5 second

This switching will causes a shift in the tape position for the REC PAUSE. Therefore, the unit generates a switching sound. When the PRESET/REGEN switch is switched after having started recording by pressing the VTR trigger button of the camera, the new setting remains valid in subsequent recording operations.

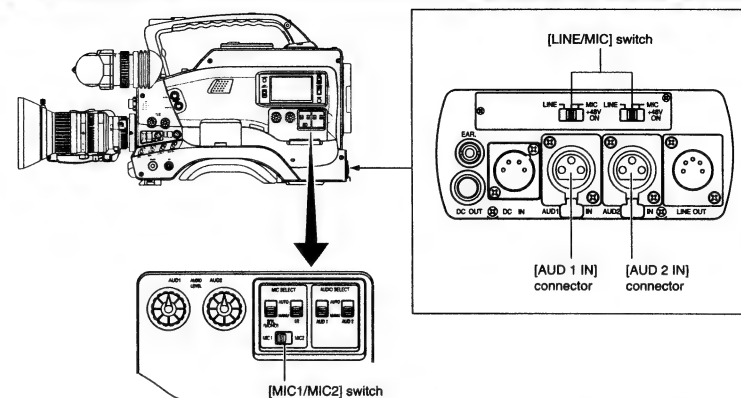
For details on the time code operations including time code presetting, see "TIME CODE OPERATION" on page 55.

The sub-time code is used to record the date and time data.

For the setting of the date and time data, see page 61.

6. SETTING AND ADJUSTMENTS BEFORE SHOOTING

6-7 Audio Input Signal Selection (E-ver.)



Selection of Front Microphone Connector

- Select the audio signal input among MIC 1 and MIC 2 connectors on the front panel using the [MIC1/MIC2] switch.

MIC 1 : Inputs the audio signal from the microphone connected to the MIC 1 connector.

MIC 2 : Input the audio signal from the microphone connected to MIC 2 connector.

- When the microphone of the MIC1 connector is used; Set the [FRONT MIC1 SELECT] of the SETUP MENU according to the microphone type (monaural or stereo) to be connected. (See page 62)

FRONT MIC 1 SELECT

- no : Set to this position when using a monaural microphone.
- st : Set to this position when using a stereo microphone.
- There is no need to set this menu switch when connecting a microphone to the MIC2 connector.

Selection of Rear Audio Input Connectors

Select the audio signal input to the AUDIO INPUT connector using the [LINE/MIC] switch. Set for AUD-1 and AUD-2 connectors separately.

LINE : Set to this position when connected to audio equipment, etc.

The reference input level is +4 dBs.

MIC : Set to this position when using the monaural microphone.

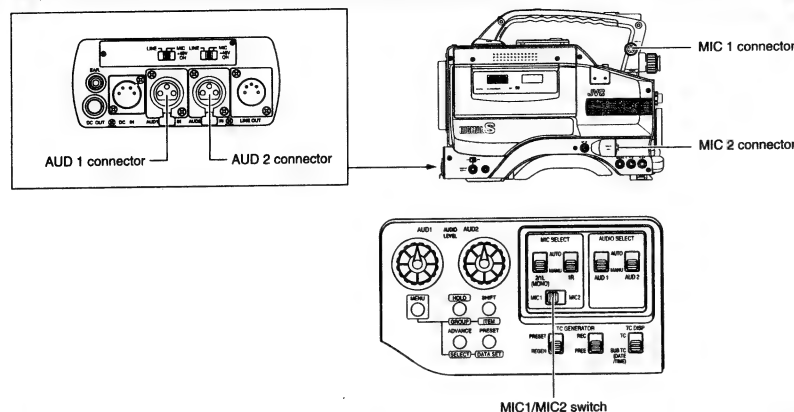
The reference input level is -60 dBs.

MIC +48 V : Set to this position when a microphone requiring +48 V DC power supply is connected. (Such as JVC MV-P615.)

Refer to page 46 for the Allocation of Audio Input signals Recorded onto the PCM Audio Channel.

6. SETTING AND ADJUSTMENTS BEFORE SHOOTING

6-8 PCM Audio Channel Allocation of Audio Input Signal (E-ver.)



A total of four input connectors are provided for audio input.

To which PCM audio channel (DA1 to DA4) the audio signal to be recorded depends on the type of camera microphone connected to the MIC1 or MIC2 connectors which are on the front panel of the camera. Refer to the settings on the list below

- Set the [MIC1/MIC2] switch and [FRONT MIC1 SELECT] on the VCR SETUP MENU according to the type of camera microphone to be connected. Refer to page 64 on the VCR SETUP MENU.

Allocation of Audio Input Signals Recorded onto PCM Audio Channels

Microphone connector to be used and microphone type	Setting		PCM Audio channel			
	[MIC1/MIC2] switch	Menu	DA1	DA2	DA3	DA4
MIC 1 connector (6 Pin) Monaural microphone (MV-P616, etc.)	MIC 1	no (MONO)	AUD1	MIC1	AUD2	AUD2
MIC 1 connector (6 Pin) Stereo microphone (PV-P612, etc.)	MIC 1	St (STEREO)	AUD1	AUD2	MIC1L	MIC1R
MIC 2 connector (XLR, 3 Pin) Monaural microphone (PV-P615, etc.)	MIC 2	Not provided	AUD1	MIC2	AUD2	AUD2

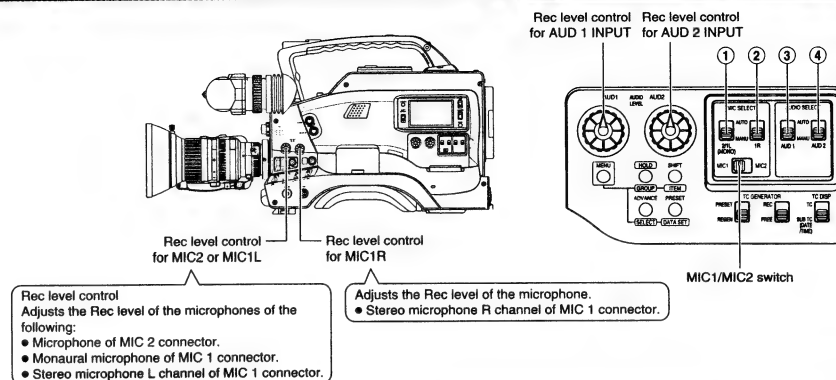
- During playback the audio signal of the DA1/DA2 or the DA3/DA4 channel is output.
- The audio signals on the DA1 and DA2 channels are always recorded on the linear track of tape for audio search.

Note :

When the tape is in playback with a VCR (BR-D80E, BR-D40E or BR-D750E series, etc.) which is not compatible with 4 channel audio signal output, the sound of DA1 and DA2 only are output.

6. SETTING AND ADJUSTMENTS BEFORE SHOOTING

6-9 Recording Level Adjustment (E-ver.)



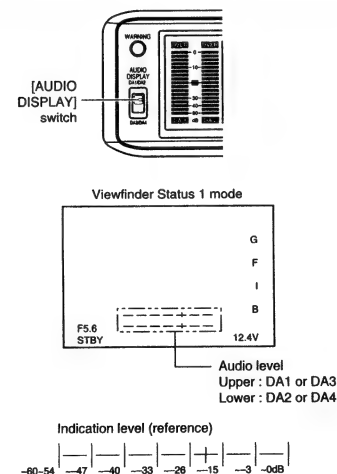
Select whether the recording level adjustment is set to Auto mode or Manual mode for each audio input connector using the AUTO/MANUAL select switches.

- When set to **AUTO** : Recording level is fixed. In this mode, the Rec level control does not function.
- When set to **MANUAL** : Recording level can be adjusted using the Rec level controls for each audio input.

Recording level AUTO/MANUAL select switch

- Select switch for MIC2 or MIC1L. This function is available to the following microphones.
 - Microphone of MIC2 connector.
 - Monaural microphone of MIC1 connector.
 - Stereo microphone L channel of MIC1 connector.
- Select switch for MIC1R. This function is available to the R-channel of the microphone of MIC1 connector.
- Select switch for AUD 1 INPUT
- Select switch for AUD 2 INPUT

Manual Recording Level Adjustment



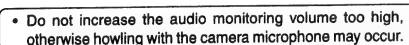
Recording level can be adjusted manually when the DY-90 is in the record, record-pause or stop mode.

- Set the AUTO/MANUAL switch to "MANUAL" according to the input signal to be manually adjusted.
- Select the audio level meter display mode for the display and viewfinder (DA1/DA2 or DA3/DA4 indication) using the AUDIO DISPLAY switch.
- Rotate the Rec level control corresponding to the required audio input, to be adjusted.
 - Adjust so that the peak level does not exceed the -3dB point when the loud sound is input.
 - With microphone input, since the limiter circuit is activated, the recording level does not exceed 0 dB even if the Rec level control is turned up.

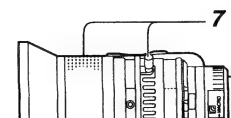
Note :

When the AUDIO INPUT LINE/MIC switch on the rear panel is set to "MIC", be sure to check that the microphone is connected to the AUDIO INPUT connector. If the microphone is not connected, increasing the recording level could cause the noise from the input connector to be recorded on the tape. When the microphone is not connected to the AUDIO INPUT connector on the rear panel, set the LINE/MIC switch to "LINE" or lower the Rec level control.

6-10 Monitoring Audio During Recording



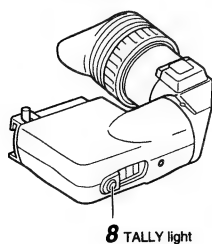
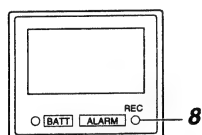
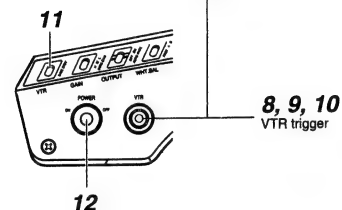
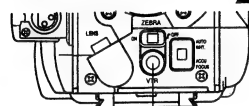
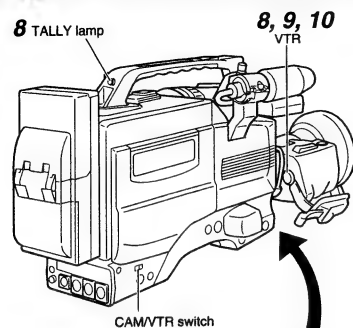
7-1 Basic Recording Operation



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7. SHOOTING OPERATION

7-1 Basic Recording Operation (Cont'd)



8. Press the VTR trigger on the unit or lens to start recording. Once recording has started, the tally lamps on the VCR section and the viewfinder tally light red, and the REC indication in the viewfinder lights green.

Notes

During time code generator use in the PRESET mode the sound trigger switch may be recorded when the VTR trigger on the lens is pressed.
To avoid this, use the VTR trigger located at the power switch side.

9. To stop recording, press the VTR trigger again. The unit enters the Record-Pause mode.

When the VTR trigger is pressed, the unit enters the record-pause mode after rewinding the tape for about 1 to 1.5 second (back-spacing).
During the back-spacing, the last section recorded on the tape is played in the reverse direction. However, during play in the reverse direction, block noise appears. You can use this as a reference for confirming whether recording has been made or not.
When the CAM/VTR switch is set to "VTR" and the setup menu item "BACK SPACE MODE SELECT" is set to "PB", the reverse playback image is output to the MONITOR OUTPUT connector and the viewfinder.

10. To restart recording:
Press the VTR trigger on the camera.

11. End recording.
Enter record-pause mode and perform the following operations as required.

■ When it is required to unload the cassette tape :

- Press the EJECT button.

■ When it is required to put the unit in save mode :

- Set the VTR switch to SAVE.
Drum rotation stops and the DY-90 enters the tape protection/power-saving mode.

12. When shooting is completely finished, ejects the cassette and turn the power off.

Notes

- The STOP and EJECT buttons do not function during recording. These buttons function during the record-pause mode.
- The REC/ALARM indicator (green) in the viewfinder blinks until recording actually starts. This is not due to any defect of the unit, but indicates that the VCR is preparing for recording.
- If the VTR trigger button is pushed very quickly and repeatedly, the viewfinder record tally light may blink incorrectly and the DY-90 does not enter the record mode. To clear this condition, turn the POWER switch to OFF.
- A neat transition to the next recorded scene cannot be guaranteed if you end a recording by setting the POWER switch to OFF. Be sure to enter record-pause mode before switching the unit OFF.
- After operating in the record-pause mode, wait for two seconds or more before switching off the power.
If the power is switched off immediately after the record-pause mode is initiated, it automatically starts searching the end of the last recorded section when the power is switched to ON again, this takes approximately ten seconds. During this operation, entry to the record mode is possible but recording cannot be carried out until the search is completed.
- Before recording a scene which is particularly important, perform test shooting to ensure that normal recording is possible.
- The power consumption can be reduced by setting the LIGHT switch on the display to OFF.

7. SHOOTING OPERATION

7-2 Save Mode

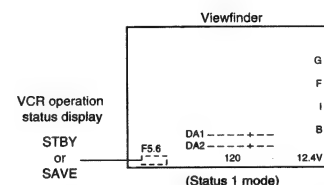
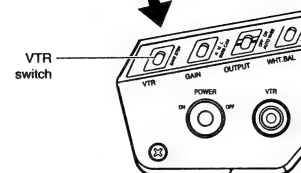
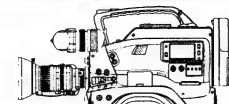


Figure shows U-ver.

When a recordable cassette tape is loaded, the DY-90 enters the record-pause mode. However the record-pause operation condition differs depending on the setting of the VTR switch.

• VTR switch setting

STBY : The DY-90 enters the record-pause mode, and the drum is rotating at this time. (Standby mode)

A "STBY" indication appears in the VCR operation mode display in the viewfinder. (Status 1 mode)

- In this condition, pressing the VTR trigger button immediately starts recording.

SAVE : The DY-90 enters the record-pause mode, however, the drum is not rotating. (SAVE mode).

The tape is protected.
A "SAVE" indication appears in the viewfinder during (Status 1 mode).

Recording from the Save mode

- In the save mode, pressing the VTR trigger button will start recording.

However, in this case, there are several seconds of interval before the DY-90 starts recording.

- Pressing the VTR trigger button again stops recording and the DY-90 enters the save mode again.

7-3 If Unit is Left In Record-Pause (Standby) Mode

When the unit has remained in record-pause (standby) mode for about 30 minutes, the unit enters tape protect mode, in which the drum rotation is stopped automatically and the tape tension is released.

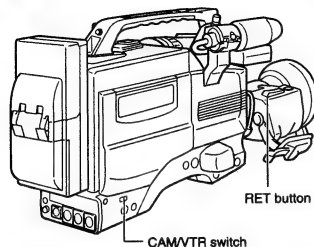
- To start recording from tape protect mode, press the VTR trigger button of the camera; the drum starts to rotate and recording starts in about 8 seconds.

- To return to record-pause mode from tape protect mode, press the VTR trigger button of the camera twice; the drum starts to rotate.

- The time until the unit enters the tape protect mode after it is put to record-pause mode can be set with the setup menu item "LONG PAUSE TIME SELECT" to 1 minute, 5 minutes or 30 minutes. (See page 64)

7. SHOOTING OPERATION

7-4 Checking Recorded Contents in Record-Pause Mode (Recording Check Function)



* This function is available even when the DY-90 is in the save mode (VTR switch set to SAVE position). After operation is finished, the DY-90 enters the save mode.

In the record-pause mode, the last recorded portion can be played back for approx. 2 seconds.

- The recorded contents can be checked with the viewfinder or the monitor connected to the MONITOR OUTPUT connector.

- Set the CAM/VTR switch to the "VTR" position beforehand.
 - In the viewfinder or on the monitor connected to the MONITOR OUTPUT connector, the video image from the VCR section is output.

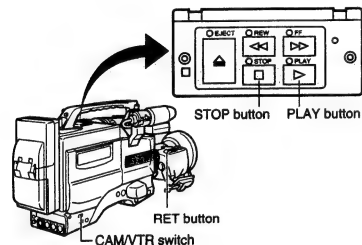
1. In the record-pause mode, press the RET button on the camera lens section.
 - The tape is slightly rewound and played back for approx. 2 seconds. After playback is finished, the tape is returned to the position at which the RET button is pressed and the record-pause mode resumes.

- When the RET button is kept pressed, the tape is rewound and played back for approx. 10 seconds at maximum.

7-5 Cueing the Scene Change Point

When successive recordings are made, cue the scene change point before starting recording.

- After the tape is run
- When the cassette tape is ejected and loaded again
- When recording from the middle of the recorded tape



Notes :

- If the VTR trigger button is pressed in the middle of the automatic scene change cueing operation, the VTR trigger function is given priority so a neat transition to the next scene cannot be guaranteed.
- Be sure to use the VTR trigger button to end every recording (because a pilot signal for ensuring a neat transition to the next scene is recorded when this is done.)
- The proper functioning of the automatic scene change cueing cannot be guaranteed if the recording time before entering the record-pause mode is less than 2 seconds.

- To check the playback image with the viewfinder or monitor, set the CAM/VTR switch to the "VTR" position.

- Set the PRESET/REGEN switch to "REGEN" for continuous recording of the time code.

1. Press the STOP button to release the record-pause mode.
2. Press the PLAY button to start playback.
3. While watching the image on the viewfinder or on the monitor, press the STOP button at the point where you want to start recording.
4. Press the RET button on the camera lens section.
 - Rewind the tape for playback of approx. 2 seconds, and search the scene change pilot signal while the tape is played back.
5. ■ When the scene change pilot signal is detected, the DY-90 enters the record-pause mode from which the next recording is to be started.
 - When the scene change pilot signal is not detected, the DY-90 enters the record-pause mode using the point as the scene change point at which the STOP button is pressed.

8. PLAYBACK MODE

8-1 Playback Procedure

Setup

- Video output signal selection

- Set the CAM/VTR switch to the "VTR" position. In this mode, the viewfinder and MONITOR OUTPUT connector output the playback image of the VCR section.

- Audio output signal channel selection

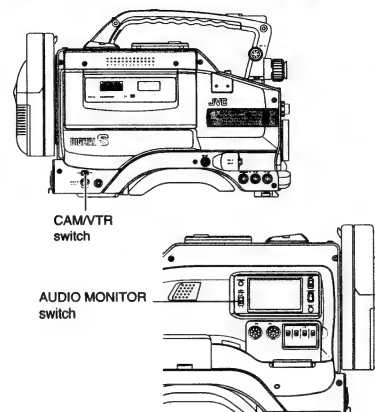
During playback, the audio signal from the PCM audio channels is not output simultaneously. Two channels only are output during playback.

- Select the audio output channel using the AUDIO MONITOR switch.

DA1/DA2 : Outputs the audio signal from the DA1 and DA2 channels.

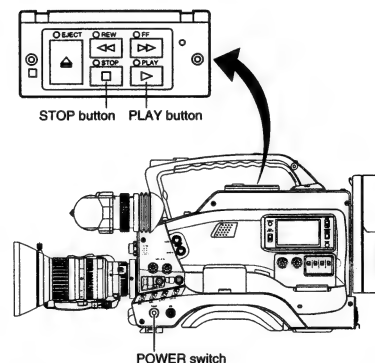
DA3/DA4 : Outputs the audio signal from the DA3 and DA4 channels.

Audio output signals are output from the AUDIO OUTPUT connector (5-pin), monitor speaker and earphone jack.



Operation

1. Turn the POWER switch to ON.
2. Load the recorded cassette tape correctly.
 - When a recordable cassette tape (with REC switch on the back of the cassette set to ON) is loaded, the VCR section enters the record-pause mode (STBY or SAVE mode).
3. Press the PLAY button.
 - The PLAY indicator lights and playback starts.
4. To stop playback, press the STOP button.
 - The STOP indicator lights and the VCR section enters the stop mode.



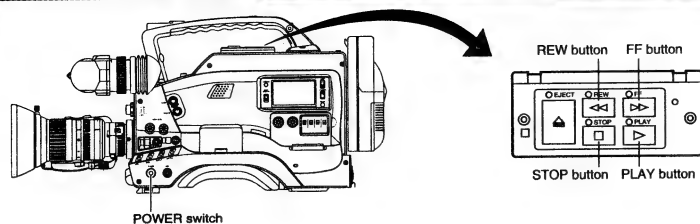
Notes:

- This unit is not capable of a manual tracking adjustment. The tracking is adjusted automatically during playback.
- When playing back the tape recorded with another VCR, digital noise may be generated.
- This unit is not capable of still image playback.
- An S-VHS or a VHS cassette tape cannot be used with this unit.
- When the automatic tracking function is activated at the start of the playback mode, digital noise may appear on the playback image.

- At the start of the playback mode, the audio signal from the linear tracks will be output. When the tape running is stabilized, the PCM audio signal is output. Only the DA1 and DA2 channel signals are recorded on the linear tracks. For this, even when the VCR section is in the DA3/DA4-channel output mode, only the DA1 and DA2 channel audio signals recorded on the linear tracks are output at the start of the playback mode.

8. PLAYBACK MODE

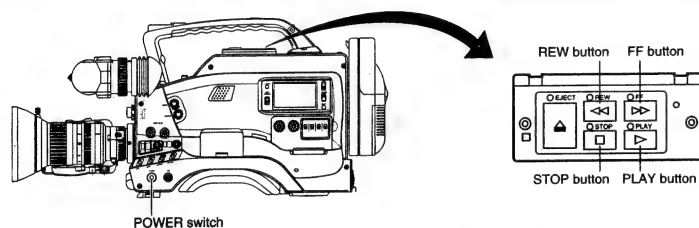
8-2 Fast-Forward, Rewind



- Press the FF button in stop mode to fast forward tape and press the REW button in stop mode to rewind tape.
- In fast forwarding and rewinding, the EE image and EE audio signal are output.
- Press the STOP button to stop fast forwarding or rewinding.

- When the tape approaches the end during fast forwarding or rewinding, the tape speed decelerates to protect the tape.

8-3 Search



- Press the FF button in play mode to search the tape in the forward direction at about 2 to 6 times the normal speed.
- Press the REW button in play mode to search the tape in the reverse direction at about 1 to 6 times the normal speed.
- Press the PLAY button to resume normal playback.

- The audio recorded on the linear track of the tape is reproduced during the search.
- Regardless of the setting of the AUDIO MONITOR switch, the audio signals from DA1 and DA2 channels are output.
- Video noise may be observed or the image may become unstable during the search, but this is not a malfunction.

Note:

When the mode is changed from search to play mode, characters are displayed for a moment on the viewfinder screen. This is not a malfunction.

9. TIME CODE OPERATION

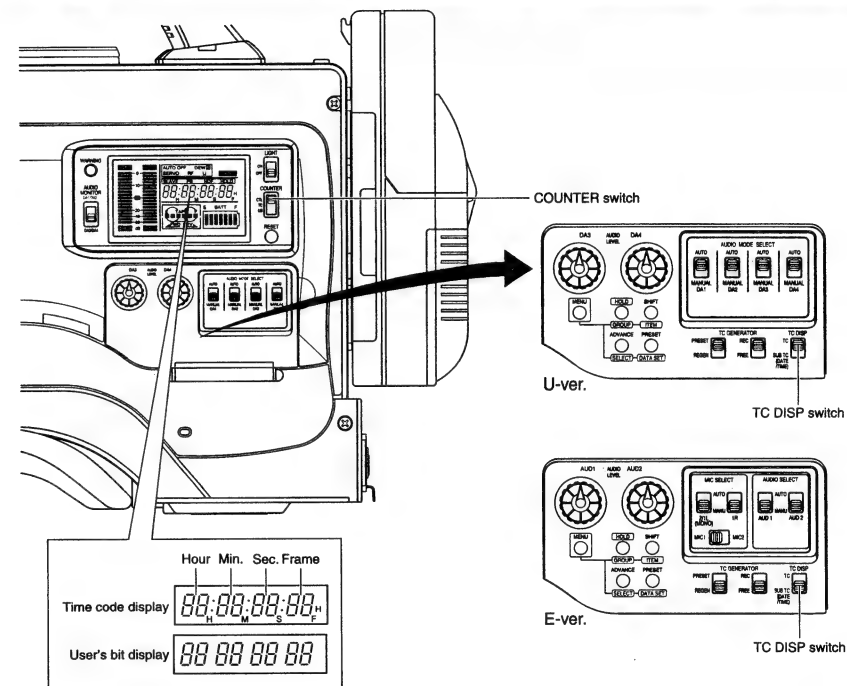
This unit records 2 time code areas on the tape; the main time code area which contains time codes for use as time data in editing, etc., and the sub-time code area which can optionally contain the date and time data.

- The main time code area contains the recording of SMPTE-standard time codes and user's bits. In play mode, the reproduced time codes or user's bits are shown on the counter display.
- The sub-time code area contains the recording of the date and time data, which can also be shown on the counter display during playback.

- Neither the main time code nor sub-time code data is output through the MONITOR OUTPUT connector.
- The generated time-codes are output from the TC OUT connector.

The following description begins with the handling method of the main time code. That of the sub-time code will be described from page 60.

9-1 Displaying Time Code



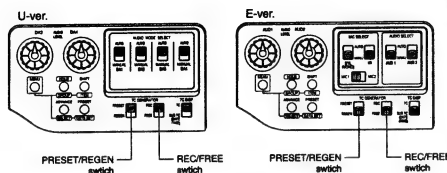
The selected time codes can be shown on the counter display during playback and recording as follows.

- Set the TC DISP switch to "TC".
If it is set to SUB TC, sub-time codes (date and time data) will be displayed.
- Set the COUNTER switch to "TC" or "UB".
TC : Time codes are displayed.
UB : User's bit data of time codes are displayed.

9. TIME CODE OPERATION

9-2 Presetting and Recording of Time Code

The time code or user's bit data to be recorded onto the tape can be preset to a desired value.



■ Setting the switches in the TC GENERATOR block

- Set the PRESET/REGEN switch to PRESET.
- Set the REC/FREE switch as follows.
 - REC** : The data preset in the time code generator runs only during recording. Use this setting to record continual time codes across scenes when recording them one after another.
 - FREE** : The data starts to run from the moment it has been preset in the time code generator.

U-ver. only

Drop frame/Non-drop frame modes

With the NTSC format, the actual number of frames per second is about 29.97 frames, while the number of frames assumed for use in time code processing standard is 30 frames. The drop frame mode compensates for this difference by dropping frames 00 and 01 at every minute whose figure cannot be divided by 10. The non-drop frame mode ignores the above difference and does not drop frames.

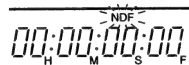
■ Setup menu setting

Select the framing mode of the time code generator with setup menu item "TCG SELECT DROP/NON-DROP".

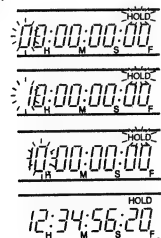
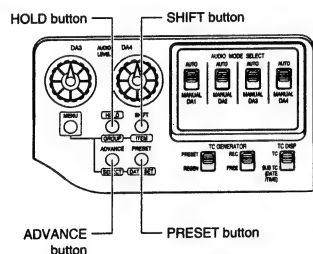
dF : The time code generator runs in drop frame mode. Use this setting when putting importance on the recording time.

nF : The time code generator runs in non-drop frame mode. Use this setting when putting importance on the number of frames.

The NDF indicator on the LCD display lights in non-drop frame mode.



TIME CODE PRESETTING PROCEDURE

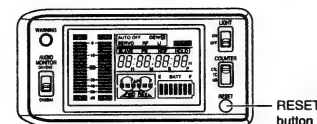


- Display the time code on the counter display. Set the COUNTER switch to TC.
 - Time code up to 23 hrs. 59 min. 59 sec. 29 frames can be preset.
- Put the time code generator in preset mode. Press the HOLD button. The HOLD indicator lights on the display to indicate the preset mode. The first digit of the counter display blinks.
- Set the value of the blinking digit. Press the ADVANCE button. The value of the blinking digit changes.
- Change the blinking digit. Press the SHIFT button. The blinking digit changes.
- Set the desired value for all digits. Repeat steps 3 and 4 for each digit.
- Preset the set data in the memory. Press the PRESET button. The set data is saved as the time code generator value. After the above operation, the HOLD indicator disappears from the display, the counter stops blinking and the time code is preset.
 - If the REC/FREE switch is set to FREE, the time code starts to run.
 If you preset a wrong time code, perform steps 3, 4, 5 and 6 again.

9. TIME CODE OPERATION

9-2 Presetting and Recording of Time Code (Cont'd)

PRESETTING USER'S BIT DATA



- Display user's bit data on the counter display and perform the same procedure as the time code presetting procedure.
 - The user's bit can be specified using numerals or alphabets from 0 to F for each digit.

- Pressing the RESET button in preset mode resets the time code or user's bit data to 00 00 00 00.
- If you have pressed the HOLD button by mistake, press the HOLD button again to return to the previous display.

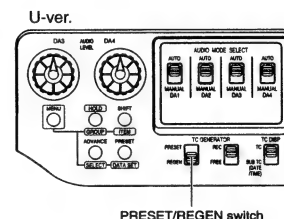
9-3 Recording Time Codes Continuously From Time Codes Recorded on Tape

The unit also incorporates a time code reader. Therefore, when the unit enters record mode from record-pause mode, it can read the time code data recorded on tape and record continual time codes after it. The recorded user's bit data is identical to the user's bit data recorded on tape.

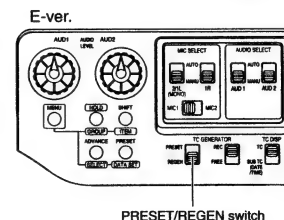
To make this possible, set the switches in the TC GENERATOR block as follows before starting recording.

■ Setting

- Set the counter display to display time codes or user's bit data.
- Set the PRESET/REGEN switch to REGEN. The time code run mode becomes unrelated to the REC/FREE switch settings.
- The framing mode of the time code generator becomes automatically identical to the mode used by the time codes recorded on the tape (drop frame or non-drop frame mode).



PRESET/REGEN switch



PRESET/REGEN switch

When the PRESET/REGEN switch is set to REGEN, the time taken for entering record mode from record-pause mode becomes slightly longer.

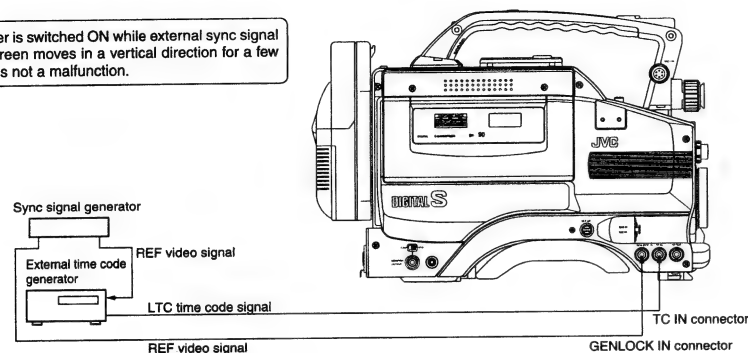
9. TIME CODE OPERATION

9-4 Recording Time Codes by Slave-Locking the Built-in Time Code Generator with the External TCG

The built-in time code generator can be synchronized (slave-locked) with the SMPTE/EBU-standard LTC time code signal which is input through the TC IN connector. Once the slave locking has been carried out, the built-in time code generator runs even when the external time code input stops. Even when the power is switched off, it continues to run on the backup lithium battery.

Note :

When the power is switched ON while external sync signal is input, the screen moves in a vertical direction for a few seconds. This is not a malfunction.



1. Input the reference video signal into the external time code generator and the GEN LOCK IN connector of this unit.

2. Display time code on the counter display.

3. Set the switches in the TC GENERATOR block as follows.
 • Set the PRESET/REGEN switch to "PRESET".
 • Set the REC/FREE switch to "FREE".

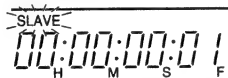
■ Setup menu setting

Set setup menu item "U-BIT SLAVE ON/OFF" as required.
 • Set to "ON" if you want to also slave lock the user's bits to the external time code generator.

U-ver. only

The framing mode is set automatically to the same mode as the input time code (drop frame or non-drop frame mode). The NDF indicator lights on the display if the framing mode is the non-drop frame mode.

4. Set and operate the external time code generator.
 → The built-in time code generator is slave-locked with the input external time code data.
 The SLAVE indicator lights on the display.



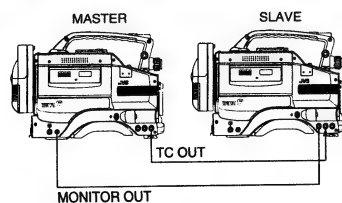
• If the external time code generator phase is not genlocked with the phase of the camera video signals, the "SLAVE" display will flicker.

• Once slave locking has been made, the built-in time code generator keeps on running even when the external time code generator is stopped.

Note :

• While the REC/FREE switch is set to "REC", slave-locking will not take place.
 Do not connect or disconnect slaves during recording as this may disturb the servo lock.

Multi-Camcorder Master-Slave Connection



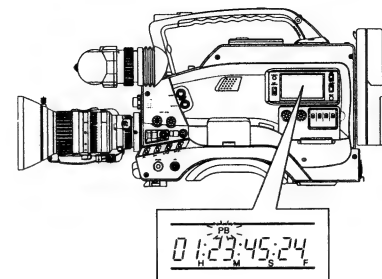
When there is only one slave DY-90, connect it as indicated in the figure left.

When connecting several DY-90s as slaves, input the REF video signal to GENLOCK IN connectors of all these units from the sync signal generator.

9. TIME CODE OPERATION

9-5 Reproducing Time Codes

The unit incorporates a time code reader which outputs the time codes and user's bit data recorded on the played tape is displayed on the counter display. The played time codes and user's bit data are not output from the TC OUT and MONITOR OUTPUT connector.



■ Set the counter display to display time codes or user's bit data.

■ Reproduce time codes.

Press the PLAY button.

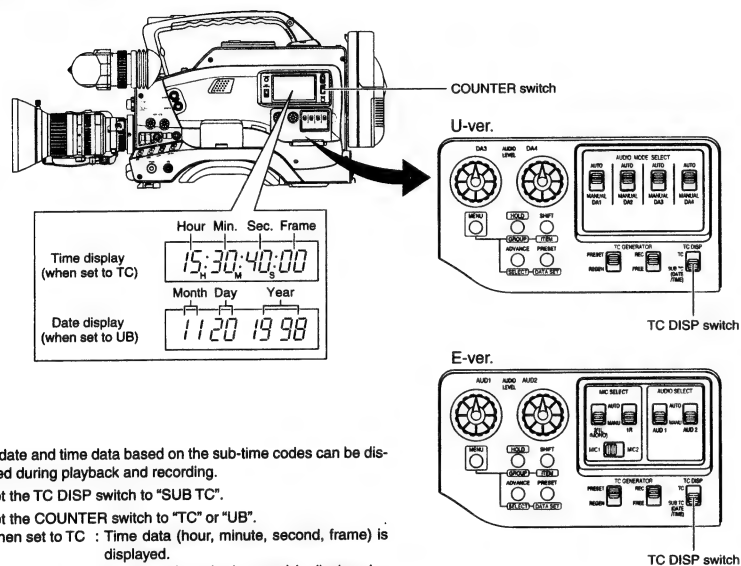
→ The PB indicator lights on the display and the reproduced time code or user's bit data is displayed.

9. TIME CODE OPERATION

9-6 Sub-Time Code (Date, Time)

The unit records a sub-time code area as an additional time code recording area to the main time code area. The sub-time code area contains data on the date and time of the day.

DISPLAYING SUB-TIME CODE



The date and time data based on the sub-time codes can be displayed during playback and recording.

■ Set the TC DISP switch to "SUB TC".

■ Set the COUNTER switch to "TC" or "UB".

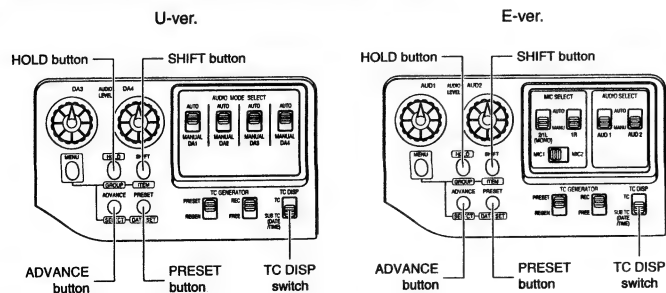
When set to TC : Time data (hour, minute, second, frame) is displayed.

When set to UB : Date data (month, day, year) is displayed.

SETTING THE DATE AND TIME

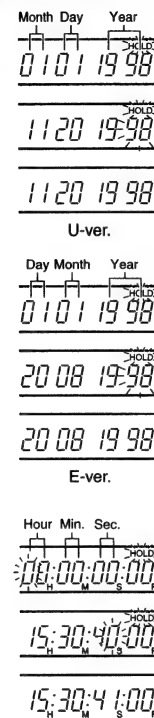
The set date and time data is stored in the sub-time code area on tape.

The set date/time data will continue the counting on the backup lithium battery, even when the power is switched off.



9. TIME CODE OPERATION

9-6 Sub-Time Code (Date, Time) (Cont'd)



■ Setting the Date

1. Display the date on the counter display.
■ Set the TC DISP switch to SUB TC and the counter switch to UB.
2. Press the HOLD button to initiate the setting mode.
The HOLD indicator lights on the display, indicating that the VCR is in the setting mode.
The first two digits of the counter display blinks.
3. Set the figures of the month.
• Press the ADVANCE button to set the figure of the blinking digit.
4. Similarly, set the figures of day and year by pressing the SHIFT button to change the blinking digit and pressing the ADVANCE button to set its figure.
5. Press the PRESET button to save the set date in the memory.
The HOLD indicator on the display turns off and the date display stops blinking.

■ Setting the Time of the Day

1. Display the time data on the counter display.
■ Set the TC DISP switch to SUB TC and the counter switch to TC.
2. Press the HOLD button to initiate the setting mode.
The HOLD indicator lights on the display, indicating that the VCR is in the setting mode.
The first digit of the counter display blinks.
3. Similarly to the date setting operation, set the figures of the hour, minute and second using the SHIFT and ADVANCE buttons.
• The hour should be set in the 24-hour mode.
• The frame cannot be set. It will be fixed to 00.
4. Press the PRESET button to save the set time in the memory.
The HOLD indicator on the display turns off and the time starts to count.

REPRODUCING THE DATE AND TIME

The recorded date and time data is not included in the video signal output from the VIDEO OUT connector or the time code signal output from the TC OUT connector.

The data is displayed only on the counter display of the VCR section during playback of the tape.

- When a tape recorded with this unit is played on a desk-top type DIGITAL S VCR (e.g. JVC BR-D50U/D51U/D80U/D85U, etc.), the date or time data is shown on the sub-time code display of the DIGITAL S VCR. The time data is displayed when the COUNTER switch of the DIGITAL S VCR is set to TC, and the date data is displayed if the switch is set to UB.

10. SETUP MENU

10-1 VCR Setup Menu

The setup menus for VCR section can be set by referring to its counter display.
The setup menu is not output to the MONITOR OUTPUT connector or viewfinder.
The set contents are stored in the memory and held even after the power is switched OFF.

VCR SETUP MENU CONFIGURATION

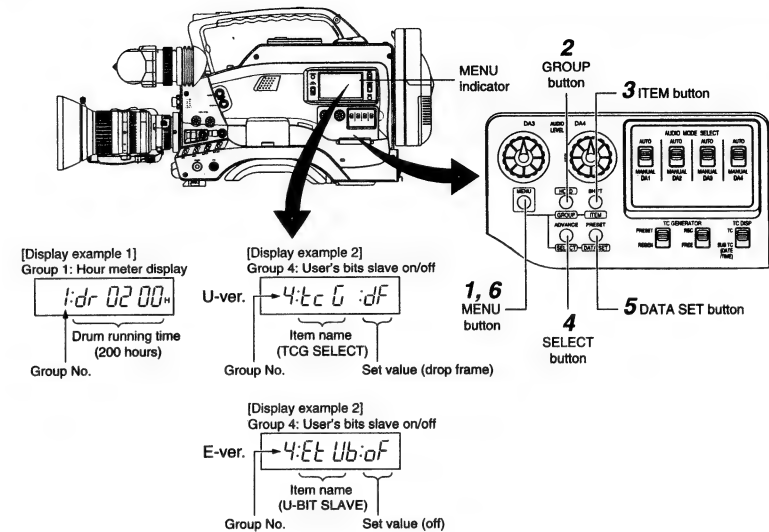
The setup menus are divided into 4 groups. Groups 1, 2 and 3 consist of display-only items such as the hour meter display, while Group 4 contains some items which can be set individually as required.

Setup menus	Display/Setting Contents
Group 1 -----	Hour meter (Drum running time) display
Group 2 -----	Remaining tape (hour:min.) display
Group 3 -----	Battery voltage display
Group 4 -----	Item : Selection of time code generator framing mode (drop frame/non-drop frame) [U-ver. only]
	Item : Selection of user's bit data during slave locking to time code (ON/OFF)
	Item : Selection of battery type (12 V/13.2 V/14.4 V)
	Item : Selection of long pause time (1 min./5 min./30 min.)
	Item : Selection of audio signal low frequencies cut for rear DA1 input connector (OFF/ON)
	Item : Selection of audio signal low frequencies cut for front DA2 (MIC) input connector (OFF/ON)
	Item : Selection of audio signal low frequencies cut for rear DA3 input connector (OFF/ON)
	Item : Selection of audio signal low frequencies cut for front DA4 (MIC 1) input connector (OFF/ON)
	Item : Selection of image to be viewed in the Viewfinder or monitor during back spacing (PB/EE)

10. SETUP MENU

10-1 VCR Setup Menu (Cont'd)

DISPLAYING AND SETTING VCR SETUP MENUS



- Enter setup menu mode.
Press the MENU button.
→ The MENU indicator lights on the display and the counter display shows the setup menu.
- Select the group.
Press the GROUP button.
→ The group No. shown on the counter display changes.
• Each press of the GROUP button changes the displayed group No. from Group 1 Group 2 Group 3 Group 4 Group 1....
■ To exit from setup menu mode after simply confirming the display in Group 1, 2 or 3, press the MENU button now. The VCR section returns to normal mode.
■ Proceed to the following steps when you want to confirm or set the setup menus in Group 4.
- Select a Group 4 item.
Press the ITEM button.
→ The setup menu item shown on the counter display changes.
• Pressing the ITEM button when the Group 1, 2 or 3 display is shown does not change it.
- Select the setting value of the selected setup menu item.
Press the SELECT button to select the setting value.
• Repeat steps 3 and 4 above for each of the items you want to set.
- Save the setting value.
Press the DATA SET button.
→ "SAVE" is displayed on the counter and the setting value is saved in the VCR memory. The counter display returns to the setup menu display when data has been saved.
- Quit setup menu mode.
Press the MENU button.
The VCR section returns to normal mode.
• If setup menu mode is quitted without saving the setting value changed with the SELECT button, "Abort" is displayed on the counter display for about 3 seconds.
To display the previously operated setup menu again, press the MENU button again while "Abort" is displayed.

10. SETUP MENU

10-1 VCR Setup Menu (Cont'd)

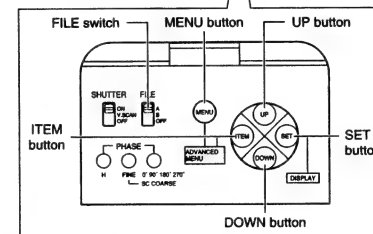
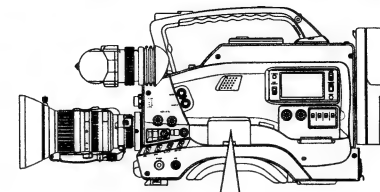
SETUP MENU CONTENTS

Group No.	Setup Menu Name	Counter Display	Contents
1	DRUM HOUR METER	1:dr 02:00	• Shows the accumulated running time of the head drum. (200 hours in this example)
2	TAPE REMAIN	2:tr 00:30	• Shows the remaining tape time in "hours:mins.". (30 minutes)
3	BATTERY VOLTAGE	3:bt 12.5v	• Battery voltage in V. (12.5 V)
4	ITEM TCG SELECT DROP/NON-DROP (U-ver. only)	4:tc 0 :dF ↓ nF	• Selects time code generator framing mode between drop frame and non-drop frame mode. dF : Built-in TCG runs in drop frame mode. Use this setting when recording time is important. nF : Built-in TCG runs in non-drop frame mode. Use this setting when frame count is important. • Factory setting: dF (Non-drop frame mode)
	U-BIT SLAVE ON/OFF	4:Et Ub:0n ↓ oF	• Selects whether user's bit data is also slave-locked when the unit is slave-locked to an external TCG. on : Slave locked. oF : Not slave locked. • Factory setting: oF (Not slave locked)
	BATT. TYPE SELECT	4:bAt t: 12 ↓ 13 ↓ 14	• Set according to the type of battery pack in use. 12 : 12 V (Set when using the NB-G1 or a 12VDC Flat Shape Type battery pack.) 13 : 13.2 V (Set when using Anton-Bauer Trimpack 13, Propack 13, Magnum 13 or Compack 13) 14 : 14.4 V (Set when using Anton-Bauer Trimpack 14, Propack 14, Magnum 14 or Compack 14.) • Factory setting: 12 (12 V) • When powered through the DC input connector, the setting is fixed at 12 V.
	LONG PAUSE TIME SELECT	4:Ln 0P:01 ↓ 05 ↓ 30	• Sets the time before the VCR section in record-pause or stop mode enters the tape protect mode (in which the drum stops rotation). 01 : 1 minute 05 : 5 minutes 30 : 30 minutes • Factory setting : 30 (30 minutes)
	DA1 LOW CUT SELECT	4:Lc A1:oF ↓ on	• Selects whether the low frequencies of the audio signal from the audio input connectors (DA1 to DA4) are cut or not. Set to ON when reducing the wind noise of the microphone. oF : OFF (without LOW CUT function) on : ON (with LOW CUT function) • Factory setting : oF
	DA2 LOW CUT SELECT	4:Lc A2:oF ↓ on	
	DA3 LOW CUT SELECT	4:Lc A3:oF ↓ on	
	DA4 LOW CUT SELECT	4:Lc A4:oF ↓ on	
	BACK SPACE MODE SELECT	4:bc SP:Pb ↓ EE	• Selects an image to be viewed in the viewfinder or monitor during backspacing in the Record/Pause mode. (Effective only when the CAM/VTR switch is set to VTR). Pb : Allows viewing of the last section recorded on the tape in reverse playback. It may result in some block noise. EE : Allows viewing of the image coming from the camera. • Factory Setting: Pb (PB)

10. SETUP MENU

10-2 Camera Section Setup Menu

In the camera section of this unit, there are two menu screens; MAIN MENU and ADVANCED MENU.



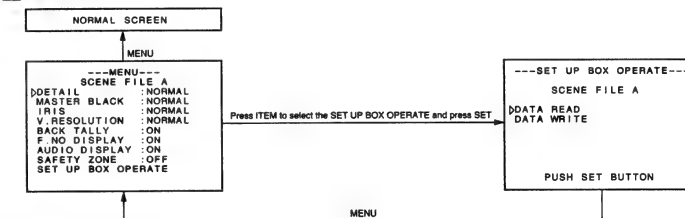
MAIN MENU

Includes convenient functions for use in recording, for example the detail enhancement function.

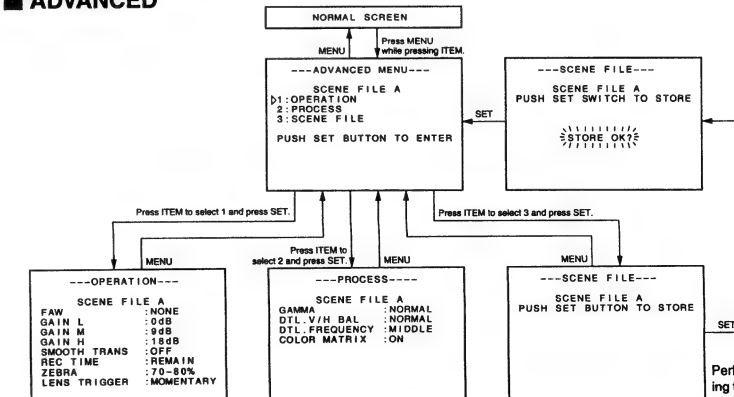
ADVANCED MENU

- OPERATION Used to change the factory-set values for the zebra pattern display, gain, etc.
- PROCESS Used to fine-adjust the gamma characteristic, etc. of the camera input signal.
- SCENE FILE Used to register the set values. Either of these menu screens are displayed in the viewfinder. For operation, refer to the operation method of each menu screen.

MAIN



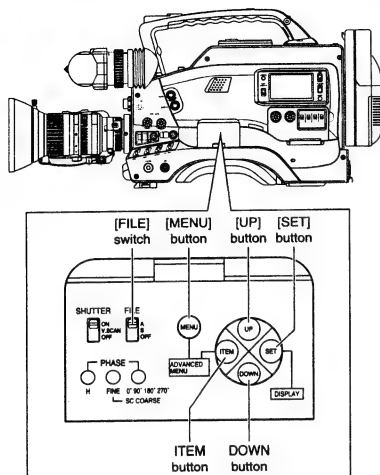
ADVANCED



Perform this when registering the data of FILE A or B.

10. SETUP MENU

10-3 Camera Section MAIN MENU Screen



<Setup Procedure>

1. Using the FILE switch, select the required file to be set up.
2. On the normal screen, press the MENU button to display the MAIN MENU screen in the viewfinder.
3. Using the ITEM button, move the cursor (▷) to the required item to be set up.
4. Change the setting value using the UP or DOWN button.
5. Press the MENU button to resume the normal screen.
At this time, the setting values are registered into the memory of DY-90. The set values are maintained even if the power is turned off.

Cursor

```

---MENU---
SCENE FILE A
DETAIL : NORMAL
MASTER BLACK : NORMAL
IRIS : NORMAL
V.RESOLUTION : NORMAL
BACK TALLY : ON
F.NO.DISPLAY : ON
AUDIO DISPLAY : ON
SAFETY ZONE : OFF
SET UP BOX OPERATE
  
```

Item	Function, Operation	Variation Range	Initial Setting
DETAIL	Adjusts the detail enhancement level. • To sharpen details Increase the number. • To soften details Decrease the number.	MAX (9) 8 1 NORMAL (0) -1 -6 MIN (-7)	NORMAL
MASTER, BLACK	Adjusts the pedestal level (master black) which is the reference of black. • To increase the pedestal level Increase the number. • To decrease the pedestal level Decrease the number.	MAX (10) 9 1 NORMAL (0) -1 -9 MIN (-10)	NORMAL
IRIS	Changes the setting value of the detecting level in the auto iris mode. • PEAK Detects the peak level of brightness • NORMAL Detects normal level • AVG Detects the average level of brightness	PEAK NORMAL AVG	NORMAL
V.RESOLUTION	Increases the vertical resolution. • NORMAL Vertical resolution 380 lines (U-ver.) 450 lines (E-ver.). • V.PLUS Vertical resolution 420 lines (U-ver.) 500 lines (E-ver.). Residual images may increase. • V.MAX Vertical resolution 450 lines (U-ver.) 540 lines (E-ver.). The sensitivity is degraded and the bright section may be colored depending on the objects.	NORMAL V. PLUS V. MAX	NORMAL

10. SETUP MENU

10-3 Camera Section MAIN MENU Screen (Cont'd)

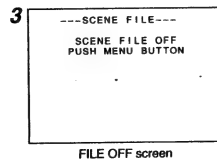
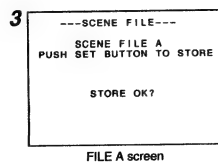
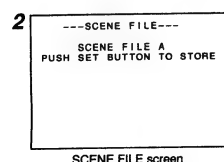
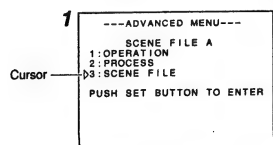
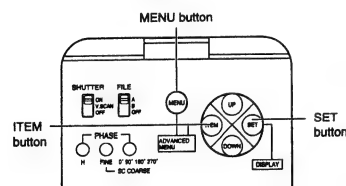
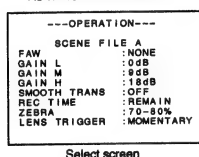
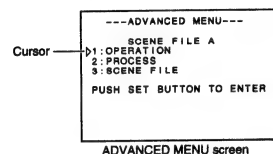
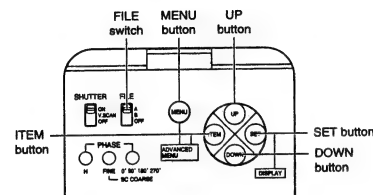
Item	Function, Operation	Variation Range	Initial Setting
BACK TALLY	Selects whether the BACK TALLY lamp on the handle section of this unit is activated or not. ON BACK TALLY lamp lights in record mode. OFF BACK TALLY lamp is not lit in record mode.	ON OFF	ON
F NO.DISPLAY	Selects whether the F number of the lens iris is displayed in the Status 1 screen or not. ON F number is displayed. OFF F number is not displayed.	ON OFF	ON
AUDIO DISPLAY	Selects whether the audio indicator is displayed in the Status 1 screen or not. ON: Audio indicator is displayed. OFF: Audio indicator is not displayed.	ON OFF	ON
SAFETY ZONE	Selects the safety zone setting. See "Safety Zone" on page 29.	OFF ZONE1 ZONE2 ZONE3	OFF
SET UP BOX OPERATE	Recalls the set up box operation screen. See "Set Up Box Operation" on page 78.		

10. SETUP MENU

10-4 Camera Section ADVANCED MENU Screen

In the ADVANCED MENU screen, there are two sub-menu screens : 1 : OPERATION (for operations) and 2 : PROCESS (for video adjustments).

The values set in the ADVANCED MENU screen can be registered in the three types of memory areas — FILE A, FILE B and FILE OFF. When the values registered in FILE A and FILE B are stored in the memory of this unit with 3: SCENE FILE screen, they are maintained even when the power is turned OFF. The values registered in the FILE OFF are registered in the memory of the DY-90 when the ADVANCED MENU screen is resumed, therefore, they are also maintained when the power is turned off.



<Setup Procedure>

1. Set the FILE switch to the file position to be set up. (FILE A, B, OFF)
2. In the normal screen, while pressing the ITEM button, press the MENU button to display the ADVANCED MENU screen in the viewfinder.
3. Press the ITEM button to move the cursor (>) to the select screen (1 : OPERATION or 2 : PROCESS).
4. Press the SET button to display the select screen.
5. On the select screen, select the setting item using the ITEM button. (The selected item blinks.)
6. Using the UP or DOWN button, change the value of the selected item.
7. After the setting is finished, press the MENU button to return to the ADVANCED MENU screen.
To register the setting values for FILE A or B, carry out the following procedure. The data in the FILE OFF is registered when the screen returns to the ADVANCED MENU.
The registered data is maintained even if the power is turned off.

<Registration Procedure>

When the registration of FILE A or B is performed, since the setting value is stored in the memory of this unit, it is not cleared even when the power is turned OFF.
(Registration operation is not required for the data of FILE OFF.)

1. Press the ITEM button to move the cursor (>) to the 3 : SCENE FILE item.
2. Press the SET button to display the SCENE FILE screen.
3. When the SET button is pressed in the SCENE FILE screen, "STORE OK?" is displayed.
When the SET button is pressed again, the setting value is registered in the FILE and the ADVANCED SCREEN is restored.
When the registration is not required, press the MENU button in the SCENE FILE screen to return to the ADVANCED SCREEN.
If the FILE is set to OFF, "PUSH MENU BUTTON" is displayed.
4. When the MENU button is pressed, The Normal screen is resumed.

10. SETUP MENU

10-4 Camera Section ADVANCED MENU Screen (Cont'd)

OPERATION SCREEN

Item	Function, Operation	Variation Range	Initial Setting
FAW	Selects the position of the W.BAL switch (on page 13) where the FAW (Full-Time Auto White Balance Adjustment) function is to be assigned. NONE FAW function is not used. A FAW is assigned to the A position. B FAW is assigned to the B position. PRESET FAW is assigned to the PRESET position.	NONE A B PRESET See page 44 (U-ver.), 43 (E-ver.) for the FAW function.	NONE
GAIN L	Selects the gain value in the GAIN L position of the sensitivity select switch.	-3dB 0dB 6dB 9dB 12dB 18dB ALC (Auto gain level control) See page 76 for the ALC function.	0 dB
GAIN M	Selects the gain value in the GAIN M position of the sensitivity select switch.	-3dB 0dB 6dB 9dB 12dB 18dB ALC (Auto gain level control) See page 76 for the ALC function.	9 dB
GAIN H	Selects the gain value in the GAIN H position of the sensitivity select switch.	-3dB 0dB 6dB 9dB 12dB 18dB ALC (Auto gain level control) See page 76 for the ALC function.	18 dB
SMOOTH TRANS	Smoothens the transition when the GAIN switch (on page 12), or W.BAL switch (on page 13) is switched over and achieves gradual change in place of sudden change. ON Activates the smooth transition function. OFF Deactivates the smooth transition function. The SMOOTH TRANS function is defeated during switching of the LoLux and FAS buttons as well as during switching of the GAIN switch which is assigned to ALC.	ON OFF	OFF
REC TIME	Sets either the remaining tape recording time or TIME CODE to be displayed on the viewfinder screen. TIME CODE TIME CODE is displayed. REMAIN Remaining time is displayed.	TIME CODE REMAIN	REMAIN

10. SETUP MENU

10-4 Camera Section ADVANCED MENU Screen (Cont'd)

Item	Function, Operation	Variation Range	Initial Setting
ZEBRA	Switches the brightness level of the object section where the zebra pattern is displayed. 70-80% Zebra pattern is displayed in sections with brightness levels between 70% and 80%. 85-95% Zebra pattern is displayed in sections with brightness levels between 85% and 90%. OVER 95% Zebra pattern is displayed in sections with brightness levels over 95%. OVER 100% Zebra pattern is displayed in sections with brightness levels over 100%.	70 - 80%, 85 - 95% OVER 95% OVER100%	70 - 80%
LENS TRIGGER	Changes the lens trigger setting according to the lens in use. MOMENTARY Compatible with momentary (non-lock type) triggering. Mainly used with lenses using the 12-pin connector. ALTERNATE Compatible with alternate (lock type) triggering. Mainly used with lenses using the 8-pin connector.	MOMENTARY ALTERNATE	MOMENTARY

PROCESS SCREEN

- The set values can be changed with the UP or DOWN button.
- After setting, press the MENU button to return to the ADVANCE MENU screen.
- In case to register the set value in the FILE A or FILE B, select "3 SCENE FILE" with the ITEM button and press the SET button.

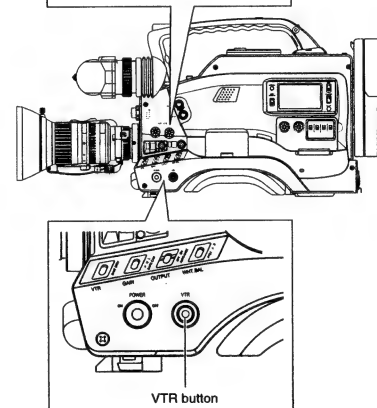
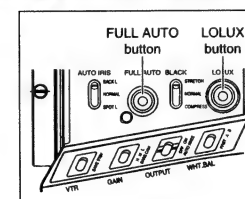
Item	Function, Operation	Variation Range	Initial Setting
GAMMA	Correction of the gamma curve to decide the replay ability of black color. • To enhance the black color replayed, however, halftones will be lost for white section Increase the number (UP) • To attenuate the black color replayed Decrease the number (DOWN) Note : • During the LOLUX operation, "FIX" is displayed because GAMMA is fixed at the MIN value. • When GAIN is set to 18 dB, "FIX" is displayed because GAMMA is fixed at the MIN value.	MAX 7 18 step to (including OFF) NORMAL to -7 MIN OFF	NORMAL
DTL. V/H BAL	Sets the direction, horizontal (H) or vertical (V), in which stronger detail enhancement is applied. • To strengthen the H enhancement Increase the number (UP). • To strengthen the V enhancement Decrease the number (DOWN).	H-MAX (4) 3 9 step to NORMAL to -3 H-MIN (-4)	NORMAL
DTL. FREQUENCY	Varies the detail enhancement level by changing the contour frequency emphasis. The setting depends on the subject: • HIGH Applies strong detail enhancement emphasis. Used to shoot subjects with fine patterns. • MIDDLE ... Applies medium detail enhancement emphasis. • LOW Applies weak detail enhancement emphasis. Used to shoot subjects with large patterns. Note : • The DTL. FREQUENCY cannot be set when the GAIN of the ADVANCED MENU is set at 18 dB.	HIGH MIDDLE LOW	LOW

10. SETUP MENU

10-4 Camera Section ADVANCED MENU Screen (Cont'd)

Item	Function, Operation	Variation Range	Initial Setting
COLOR MATRIX	Sets the color matrix • ON The color replayed is enhanced, but noise increases. • OFF Deactivates the color matrix function Note : • When the GAIN value exceeds +15 dB, the color matrix does not function even in the ON position. • During the LOLUX operation, COLOR MATRIX is fixed to the OFF setting and "FIX" is displayed.	ON OFF	ON

10-5 Resetting Setup Data



Resetting the FILE data

Data registered in the FILE A or FILE B areas can be cleared to restore the initial setting value.

<How to reset FILE A>

While pressing the **FULL AUTO** button, turn the power ON.

<How to reset FILE B>

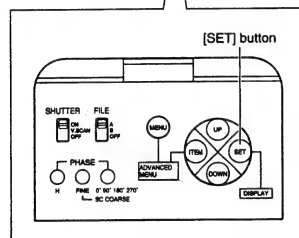
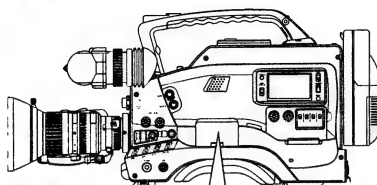
While pressing the **LOLUX** button, turn the power ON.

<How to reset FILE OFF>

While pressing the **VTR** button, turn the power ON.

10. SETUP MENU

10-5 Resetting Setup Data (Cont'd)



System Reset

Data registered for all setting items can be cleared to restore the initial setting values.

Note:

The mechanical switch positions and auto white balance memory are not cleared.

How to reset the system

While pressing the SET button, turn the power ON.

System Reset Items and Initial Setting Values

Item	Initial Setting Value
SHUTTER	1/100 (U-ver.), 1/120 (E-ver.)
V.SCAN	1/100.2 (U-ver.), 1/120.1 (E-ver.)
STATUS SCREEN	STATUS 0
LOLUX	OFF
FULL AUTO	OFF
DETAIL	NORMAL
MASTER BLACK	NORMAL
IRIS	NORMAL
V.RESOLUTION	NORMAL
BACK TALLY	ON
F.NO DISPLAY ON	
AUDIO DISPLAY	ON
SAFETY ZONE OFF	

Item	Initial Setting Value
SCENE FILE	FAW
	GAIN L
	GAIN M
	GAIN H
	SMOOTH TRANS
	REC TIME
	ZEBRA
	LENS TRIGGER
	GAMMA
	DTL.V/H BAL
	DTL.FREQUENCY
	COLOR MATRIX

11. FEATURES OF THE CAMERA SECTION

11-1 Full-Time Auto White Balance (FAW)

---OPERATION---	
SCENE FILE	A
FAW	NONE
GAIN L	0dB
GAIN M	9dB
GAIN H	18dB
SMOOTH TRANS	OFF
REC TIME	REMAIN
ZEBRA	70-80%
LENS TRIGGER	MOMENTARY

The FAW function adjusts the white balance value automatically as the lighting condition changes.

This mode is convenient when you have no time to adjust the white balance or when the camera is moved frequently in and out of places under different lighting conditions.

Setting procedure

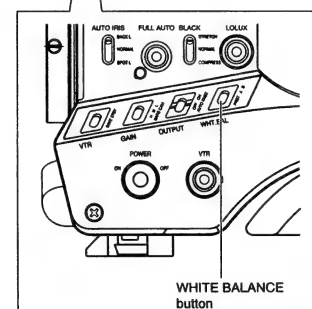
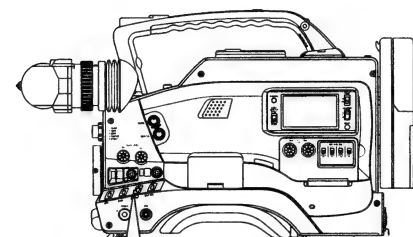
The FAW function can be activated with item "FAW" on the Advanced Menu.

This item allows setting of the FAW function to one of the white balance switches, A, B or PRESET. Select "NONE" if the FAW function is not required.

See page 69.

CAUTION :

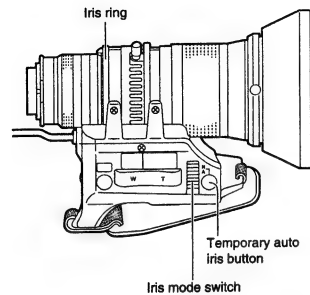
The FAW(Full-time Auto White balance) function cannot provide optimum white balance with an object outside the FAW adjustment range, for example when it contains only a single color or not enough white color.



11. FEATURES OF THE CAMERA SECTION

11-2 IRIS (Brightness) Adjustment

LENS IRIS ADJUSTMENT



The lens iris can be adjusted by any of the following three methods.

- **Automatic adjustment**
Set the iris mode switch to "A (Auto)".
The iris is adjusted automatically according to the brightness of the object.
- **Manual adjustment**
Set the iris mode switch to "M (Manual)".
The iris can be adjusted manually by rotating the iris ring.
- **Temporary auto iris adjustment**
When this button is pressed during manual iris adjustment, the auto iris adjustment mode is activated only while this button is held depressed.

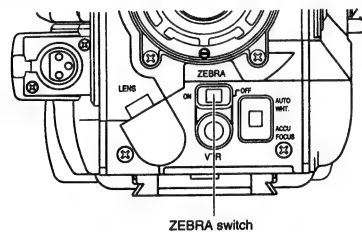
■ Changing the auto Iris adjustment setup

Under special lighting conditions such as back-light condition, it is often suitable to change the value set by the auto iris adjustment.

This can be done by any of the following methods.

- Setting the AUTO IRIS LEVEL switch of the camera head (See page 77.)
- Setting item "IRIS" in the Main menu screen. (See page 66.)

ZEBRA PATTERN DISPLAY DURING MANUAL ADJUSTMENT



By setting the ZEBRA switch to ON, oblique stripes (zebra pattern) can be displayed in the sections with signal levels of 70% to 80% on the viewfinder screen.

The zebra pattern can be used as a reference for manual iris adjustment.

When adjusting the iris manually, adjust it so that the zebra patterns are displayed in the section which you want to stress in the object.

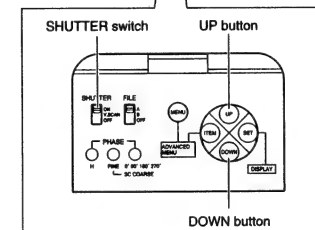
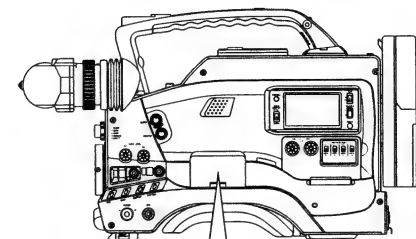
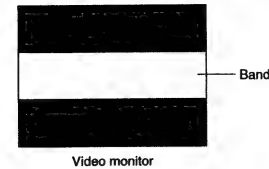
- The initial setting is 70 to 80%. However, with the "ZEBRA" setting on the ADVANCE MENU, zebra patterns can be displayed in the section of 85 to 95%, over 95% and over 100% in brightness level. (See page 70)

11. FEATURES OF THE CAMERA SECTION

11-3 Shooting the Screen Image on the Computer Monitor

■ Outline

- The following operation allows the alignment of the shutter speed of the camera with the variable scanning rate of the computer monitor or display.
- When a computer monitor or display is shot with the camera, a bright horizontal line indicating excessive exposure is displayed in cases when the scanning rate of the monitor is faster than the shutter speed of the camera or a dark horizontal line indicating insufficient exposure is displayed in cases when the monitor's scanning rate is slower than the camera's shutter speed.
- The scanning frequency of the monitor is variable due to various reasons during the computer operation. Adjust the scanning rate so as to obtain a stable image while observing the image on the viewfinder screen.



■ Variable Scan [V.SCAN]

• Basic operation

Set the SHUTTER switch to the center position (V.SCAN) then adjust the shutter speed with the UP or DOWN button. (The speed is displayed on the viewfinder screen.)

• Compatible frequencies

The variable scan function is compatible with the scanning frequencies in the following range:

60.5 to 1966.7 Hz : U-ver.
50.4 to 1953.1 Hz : E-ver.

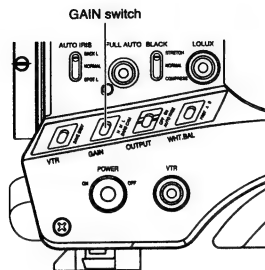
- If the SHUTTER switch has already been set to ON or V.SCAN, press the UP or DOWN button to display the shutter speed, then press the same button again to change the displayed speed.

11. FEATURES OF THE CAMERA SECTION

11-4 Gain (Sensitivity) Adjustment

The gain should be switched when the brightness is not enough due to the poor lighting condition.

GAIN SWITCHING



This switch allows the gain to be boosted when the illumination of the object is insufficient.

Switch Position	Factory-Set Gain
L	0 dB
M	9 dB
H	18 dB

When this is switched, the newly set gain is displayed for a few seconds on the status 0 or mode 1 screen inside the viewfinder. Set it to L (0 dB) in normal use.

■ The gain set with each of the switch positions can be set with "GAIN" of the ADVANCED MENU. See page 69 for details.

■ It is also possible to use the ALC which varies the gain automatically. See page 69 for details.

■ Smooth gain transition

The gain transition can be made smoother using "SMOOTH TRANS" of the ADVANCED MENU.

However, note that the SMOOTH TRANS function is not available if the switch is set to ALC.

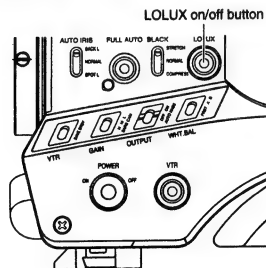
Note :

CAUTION FOR THE GAIN SETTING

■ When the GAIN is set to 18dB, GAMMA is fixed at the MIN and "FIX" is displayed on the GAMMA item of the Advanced menu screen.

■ If the illumination is insufficient when GAIN is set to the ALC, the sensitivity is increased automatically. However, in order to make the screen look brighter, the noise is increased a little with the ALC (Auto Level Control) function compared to that when the sensitivity is increased manually.

GAIN BOOST UNDER LOLUX CONDITION



The LOLUX on/off button is designed to be used when insufficient illumination insufficient cannot be compensated for with the GAIN switch alone.

Press the button to enter the LOLUX mode in which the gain is boosted by about 33 dB.

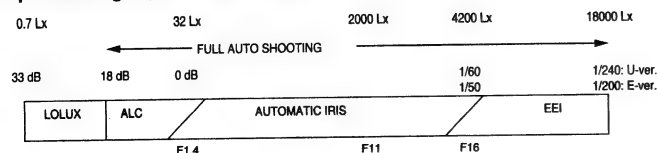
"LOLUX ON" is displayed for a few seconds on the status 0 or 1 mode screen inside the viewfinder.

Pressing the button again cancels the LOLUX mode.

"LOLUX OFF" is displayed for a few seconds.

■ When the LOLUX is in use, the image definition on the screen will degrade to increase residual images, but it is not a malfunction.

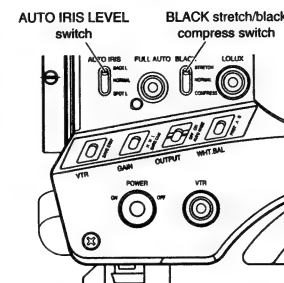
[Relationship between gain, iris and shutter]



11. FEATURES OF THE CAMERA SECTION

11-5 Switch Setup According to Illumination and Object

SWITCH FUNCTIONS



AUTO IRIS LEVEL switch

This switch allows changing of the reference value for the auto iris adjustment according to the lighting condition.

BACK. L : When the object is in the back-light condition. Sets the Auto Iris reference value to a value which is about 1 step wider than the standard setting.

NORMAL : Normal lighting condition.

SPOT. L : When the object is under a spotlight.

Sets the Auto Iris reference value to a value which is about 1 step narrower than the standard setting.

BLACK stretch/black compress switch

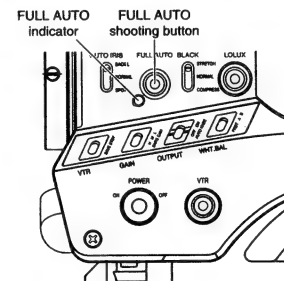
On the black screen, this switch makes the image easier to see by varying the black gain.

BLACK STRETCH : Boosts the black gain to improve the reproducibility of black color.

NORMAL : Normal black gain.

BLACK COMPRESS : Attenuates the black gain to make the image sharper.

FULL AUTO SHOOTING (FAS) FUNCTION



The FAS function provides a wide range of compatibility with shooting conditions which varies as you move between indoors and outdoors or between bright and dark locations. It is not necessary to change the switch and filter positions every time you move.

The FAS function provides an integrated control of the ALC (Automatic Level Control), Auto iris and FAW (Full-time Auto White balance) functions.

Operation

1. Simply press the FULL AUTO button to enter the FAS mode, in which the FULL AUTO indicator lights and "FAS" is displayed on the right of the viewfinder screen.
2. Pressing the FULL AUTO button again cancels the FAS mode and turns the FULL AUTO indicator off.

Automatic Setting Contents

- If you have been displaying the color bars, the screen is switched automatically to the camera image.
- The auto iris adjustment mode is entered even if the iris mode switch of the lens is set to Manual.
- The GAIN switch and WHT. BAL switch settings are defeated in the FAS mode.
- The LOLUX button setting is active even in the FAS mode. However, the ALC and EEI are defeated in the LOLUX mode, in which only the auto iris adjustment and FAW are used.
- All of the previous setting contents are recalled when the FAS mode is canceled.
- The SMOOTH TRANS function is defeated during switching by the FAS function.

Note:

- When the power is switched ON in the FAS mode, it will take approximately 10 seconds for the FAS to complete automatic adjustment. Do not perform any recording during these few seconds.
- During FAS mode, the audio recording level is not set automatically to the AUTO mode. This is set according to the AUTO/MANUAL switch of the VCR section.

11. FEATURES OF THE CAMERA SECTION

11-6 Set Up Box Operation

When the set up box is used, the data registered in the FILE (A, B or OFF) memory can be written to be recalled later.

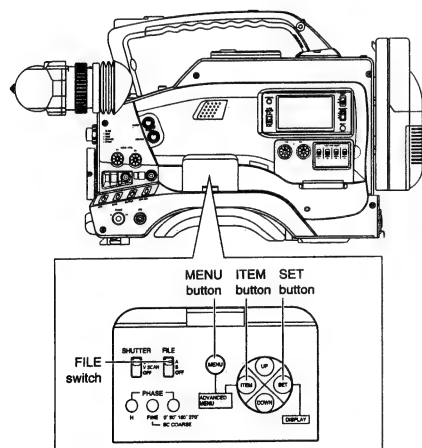
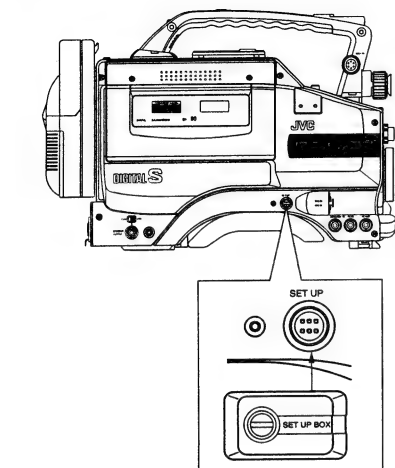
<Attaching>

Insert the set up box as shown in the figure and tighten the screw (regardless of the power being ON or OFF).

<Writing>

The setting data in the FILE can be written onto the set up box.

1. Select the FILE to be written.
Depending on the FILE switch setting, operation differs as follows:
A : Menu switch data registered in FILE A of this unit is written onto FILE A of the set up box.
B : Menu switch data registered in FILE B of this unit is written onto FILE B of the set up box.
OFF : Menu switch data registered in FILE OFF of this unit is written onto FILE OFF of the set up box.
2. In the normal screen, press the MENU button to display the MENU screen in the viewfinder.
3. Using the ITEM button, move the cursor (▷) to the SET UP BOX OPERATE item and press the SET button.
The SET UP BOX OPERATE screen appears and the FILE which is set at procedure "1." is displayed. (A, B, OFF)
4. Using the ITEM button, move the cursor (▷) to the DATA WRITE item and press the SET button.
"DATA WRITE OK?" is displayed.
To cancel writing, press the MENU button.
5. To write the data, press the SET button.
The data of this unit is written onto the set up box and "WRITE OK" is displayed.
6. After writing is finished, press the MENU button to return to the MENU screen.
Press the MENU button again to restore the normal screen.



2 ---MENU---
SCENE FILE A
DETAIL : NORMAL
MASTER BLACK : NORMAL
IRIS : NORMAL
V. RESOLUTION : NORMAL
BACK TALLY : ON
F. NO. DISPLA : ON
AUDIO DISPLAY : ON
SAFETY ZONE : OFF
▷SET UP BOX OPERATE
PUSH SET BUTTON

3 --SET UP BOX OPERATE--
SCENE FILE A
DATA READ
▷DATA WRITE
PUSH SET BUTTON

4 --SET UP BOX OPERATE--
SCENE FILE A
DATA READ
▷DATA WRITE OK?
PUSH SET BUTTON

5 --SET UP BOX OPERATE--
SCENE FILE A
DATA READ
▷DATA WRITE OK?
WRITE OK

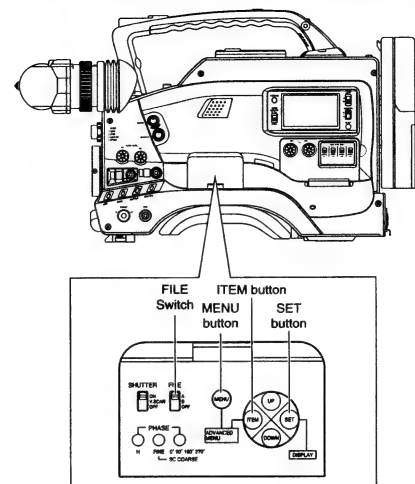
11. FEATURES OF THE CAMERA SECTION

11-6 Set Up Box Operation (Cont'd)

<Read Out>

The data in the set up box can be read out and written onto this unit.

1. Select the required FILE.
Depending on the FILE switch setting, operation differs as follows:
A : Menu switch data in FILE A of set up box is read out and written onto FILE A of this unit.
B : Menu switch data in FILE B of set up box is read out and written onto FILE B of this unit.
OFF : Menu switch data in FILE OFF of set up box is read out and written onto FILE OFF of this unit.
2. In the normal screen, press the MENU button to display the MENU screen in the viewfinder.
3. Using the ITEM button, move the cursor (▷) to the SET UP BOX OPERATE item and press the SET button.
The SET UP BOX OPERATE screen appears.
4. Using the ITEM button, move the cursor (▷) to the DATA READ item and press the SET button.
"DATA READ OK?" is displayed.
To cancel reading, press the MENU button.
5. To read out the data, press the SET button.
The data of the set up box is read out and written into the unit, then "READ OK" is displayed.
To read out another FILE data, repeat the operation in steps 1 to 5.
6. After reading is finished, press the MENU button to return to the MENU screen.
Press the MENU button again to restore the normal screen.



2 ---MENU---
SCENE FILE A
DETAIL : NORMAL
MASTER BLACK : NORMAL
IRIS : NORMAL
V. RESOLUTION : NORMAL
BACK TALLY : ON
F. NO. DISPLA : ON
AUDIO DISPLAY : ON
SAFETY ZONE : OFF
▷SET UP BOX OPERATE
PUSH SET BUTTON

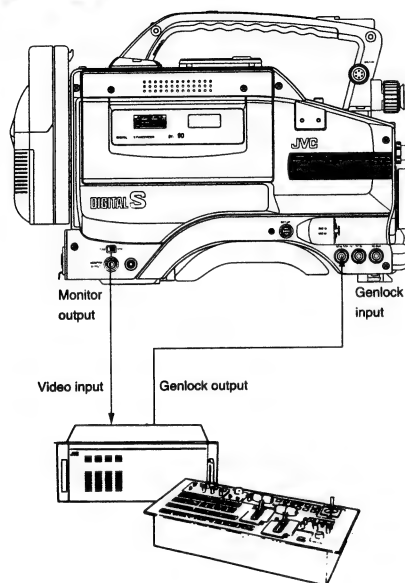
3 --SET UP BOX OPERATE--
SCENE FILE A
▷DATA READ
DATA WRITE
PUSH SET BUTTON

4 --SET UP BOX OPERATE--
SCENE FILE A
▷DATA READ OK?
DATA WRITE
PUSH SET BUTTON

5 --SET UP BOX OPERATE--
SCENE FILE A
▷DATA READ OK?
DATA WRITE
READ OK

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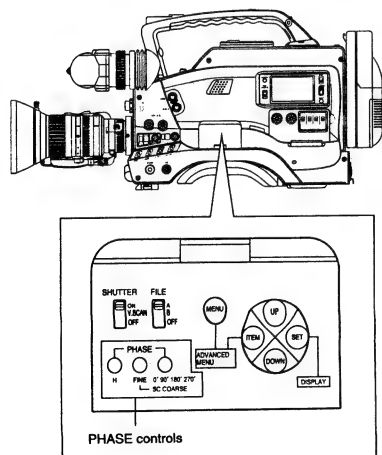
12-1 Connection with a Switcher



Genlocking is a function which synchronizes the video output signal of the camera with another component including a camera and switcher. The phases of the camera signal can be adjusted relatively with reference to the black burst or composite video signal. The camera is genlocked through the genlock input connector or the remote control unit.

Note :

When the power is switched ON while external sync signal is input, the screen moves in a vertical direction for a few seconds. This is not a malfunction.



• Phase Adjustment

Two phase controls are provided for use in adjusting the horizontal and the color phases.

H : Horizontal sync phase control for use in adjusting the H phase so that the reference signal and the video output signals are coincident in terms of position and time on the screen.

SC COARSE : A rough adjustment of the sub carrier (SC) can be made while observing a vector scope. (0°, 90°, 180°, 270°)

SC FINE : A fine adjustment can be made. If sufficient adjustment cannot be made, switch the SC COARSE and try the SC FINE adjustment again.

• The adjustments require the use of external measuring instruments such as a waveform monitor, oscilloscope and vector scope.

As the signal phase is unstable for a moment after the power of each piece of equipment is turned on, wait a while before starting the phase adjustment.

CAUTION :

The camera cannot be genlocked with a VCR playback signal because this may cause a sync error or color phase variation. However, this is not a malfunction but due to the timebase variation in the VCR playback signal that corresponds to the wow and flutter of the audio tape playback signal. If you should use the VCR playback signal as the reference signal, be sure to correct the signal using a timebase corrector or similar equipment.

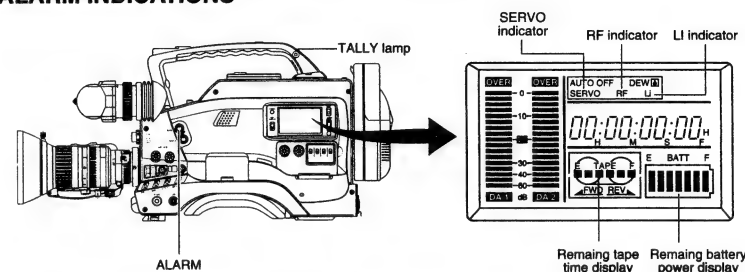
12. OTHERS

12-2 Trouble Shooting

The unit provides warning on troubles in the operating situations using indicators, LCD displays and monitor tones. The warning consists of the following two kinds of information.

- **Alarm indications** : These indications are given to provide warning on the VCR situation, for example when the tape or battery pack should be replaced.
- **Error code display** : In case an error occurs with the VCR operation, the unit applies self-diagnostics of the cases and shows the diagnostics results on the counter display. At the same time as displaying an error code display, the VCR stops operation automatically or ejects the cassette tape.

ALARM INDICATIONS



The following chart summarizes the operation of the alarm system.

■ SYMPTOMS

VCR Display Alarm indicator	Symptom	VCR section Behavior, Treatment
SERVO	Lights in the case the drum servo trouble in recording. Lights when the input video signal is disturbed or the unit is subject to shock. (Displayed only in record mode)	Operation : Continues. Treatment : • Check input video signal. • Signal is disturbed when the unit is subject to a violent shock. In other cases, consult your dealer or nearest JVC-authorized service agent.
RF	Lights in case of video head clog. (Displayed only during back-spacing for record-pause mode.)	Operation : Continues. Treatment : Clean the head with the special head cleaning tape. See page 7.
LI	Lights when lithium battery for time code generator and date/ time data backup is exhausted.	Operation : Continues. Treatment : Replace it with a new lithium battery. See page 34.
Remaining tape time	• Approx. 2 min. before tape end. (Displayed only in record or record-pause mode) The TALLY lamp and alarm tone are activated only in the record mode.	Operation : Continues.
	When tape has ended completely.	Operation : Stops.
Remaining battery power	When the remaining battery power is low.	Operation : Continues. Treatment : Replace battery pack early.
	When the battery power drops to an insufficient level.	Operation: Stops automatically. The camera may supply abnormal signals, when continuing to use a low power battery. This is not a malfunction.

See page 1-24 "1.10 HOW TO DETECT THE ALARM".

12-2 Trouble Shooting (Cont'd)

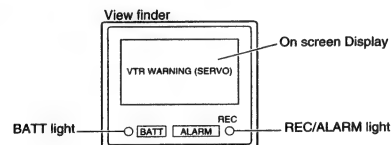
ALARM INDICATIONS (Con'd)

■ The LCD Display, WARNING Indicator, TALLY Lamp, Alarm Tone and Viewfinder Act Depending on Situations as Shown in the Following Table.

Alarm Indications				Viewfinder		
LCD Display	WARNING Indicator	TALLY lamp	Alarm Tone	Warning Lights		On Screen Display
				REC Light	BATT Light	
SERVO indicato	●	●	■■■■■	●	—	VTR WARNING (SERVO)
RF indicator	●	●	■■■■■	●	—	VTR WARNING (HEAD)
LI indicator	—	—	—	—	—	—
Remaining tape time	●	●	■■■■■	●	—	TAPE NEAR END Approx. 3min. before tape end.
Remaining battery power	●	●	■■■■■	●	●	LOW BATTERY
	●	●	■■■■■	●	●	LOW BATTERY

• The alarm tone output is superimposed in the audio signal output from the monitoring loudspeaker or EARPHONE jack. The volume of the alarm tone can be adjusted with the ALARM control.

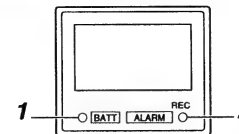
Display symbols ● : Steady lighting. ○ : Blinking once per second. ⊗ : Blinking 4 times per second.
■■■■■ : Continuous sound. — : Sound interrupted once per second. ■■■■■ : Sound interrupted 4 times per second.



12-2 Trouble Shooting (Cont'd)

WARNING MESSAGE ON VIEWFINDER

■ Viewfinder Warning Lights



1. BATTERY light

- This blinks red when battery voltage becomes too low for the camera to operate.
- This lights red when the battery has run out.

2. REC/ALARM light

This light shines for these conditions.

- Solid Green : • While recording
- Blinks Green : • While the VCR prerolls before recording
- If the tape is finishing.
- If the VCR malfunctions.

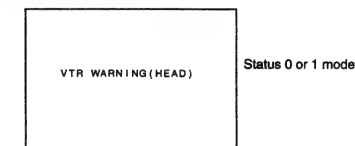
Automatic warnings :

- LOW BATTERY : This blinks when the battery level falls too low.
- TAPE NEAR END : There are less than 3 minutes tape remaining.
- TAPE END : The tape has run out.

■ Function Failures

When a trouble occurs on the VCR section or a mis-operation is performed, the following warning message will appear in the viewfinder.

- VTR WARNING (HEAD) : Lights in case of video head clog. (Displayed only during backspace for record-pause mode.)
- VTR WARNING (SERVO) : Lights in case drum servo trouble in recording.
- VTR WARNING (DEW) : Lights when condensation occurs in the VCR section.
- VTR WARNING (HARD) : Lights when a trouble occurs in the VCR section. For details of trouble, check the error code indication chart on page 85.
- REC INHIBIT : Lights when the VTR trigger button is pressed with an unrecordable cassette tape (with REC switch on the back of the cassette set to OFF) loaded.
- NO TAPE : Lights when the VTR trigger button is pressed with no cassette tape loaded.

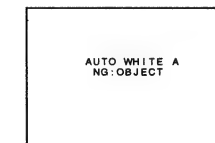


■ White Balance Function

AUTO WHITE A, B : Check whether the object being shot is white enough. Check for proper filter.

AUTO WHITE A, B : Check to see if the sun or other bright light is shining in the lens. Check that the IRIS is adjusted properly.

AUTO WHITE A, B : Check to see if increasing gain or lighting will help.

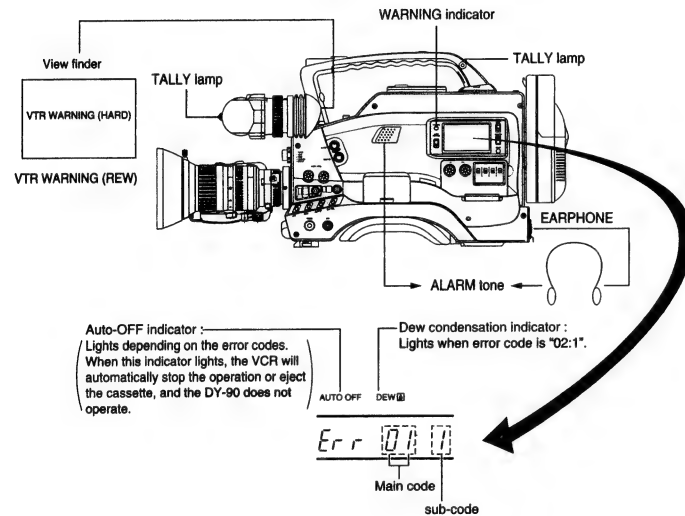


12. OTHERS

12-2 Trouble Shooting (Cont'd)

TROUBLES WITH ERROR CODE OUTPUTS

In case of trouble during the operation of the VCR, it applies self-diagnostics to identify the cause and displays the result in the form of an error code. The error code consists of the "main code" which indicates its contents and the "sub-code" which indicates the details. At this time, the LCD display, the WARNING indicator and alarm tone also act according to the current VTR situation. In the viewfinder, the "VTR WARNING (DEW)" message appears when condensation occurs (error code 02:01), and the "VTR WARNING (HARD)" message appears when some of the other error codes are displayed.



WARNING indicator	Alarm Tone	Display	VCR Operation
Red blinking	Continuous	"Error code"	• Automatically ejects the cassette. It can be inserted again.
		"Error code" plus "AUTO OFF"	• Automatically stops operation or ejects the cassette. (Auto OFF*). "VTR WARNING (HARD)" is displayed on the viewfinder screen. The VCR does not accept any operation.
Red, steady lighting	Intermittent	"02:1" and "DEW [D]"	• Dew is condensed in the VCR. "VTR WARNING (DEW)" is displayed on the viewfinder screen. The VCR does not accept operation until indicators disappear from the display.

★ In the Auto OFF status, it is impossible to operate the VCR. This condition can be corrected by switching the POWER off and then switching it ON again. If the same trouble occurs again after the power is turned ON, there may be a failure in the VCR. Please consult your dealer or nearest JVC-authorized service agent.

This unit is microcomputer-controlled equipment, which may malfunction due to external noise or interference. In this case, switch the POWER OFF, remove the lithium backup battery, and switch the POWER ON again after a few minutes.

→ See page 1-25 "1.11 ERROR CODES".

12. OTHERS

12-2 Trouble Shooting (Cont'd)

TROUBLES WITH ERROR CODE OUTPUTS

Error Code	Error Details	VCR Operation	Treatment
01 : 1	Tape sensor LED wire is disconnected	Ejects cassette and does not accept any operation while the error is displayed.	Switch power ON again.
02 : 1	Condensation (dewing)	Does not accept any operation while the error is displayed. When condensation disappears, the indicators turn off.	Leave the unit with the power ON, until "DEW" display disappears.
32 : 1 32 : 2	Tape loading impossible.	Ejects cassette	Insert cassette again.
33 : 1 (AUTO OFF)	Tape unloading impossible.	Stops operation. Does not accept any operation.	Switch the power OFF and then switch it back ON. However, the tape may be damaged depending on the situation. So consult with the JVC authorized service agent.
56 : 3 to 56 : 8	Tape is cut or tape is slack.	Ejects cassette.	Check cassette and insert again if it is OK.
57 : 1 to 57 : 4	Tape end sensor error.	Rewinds tape to confirm. If tape end is detected again, ejects the cassette.	Check cassette and insert again if it is OK.
58 : 1 to 58 : 4	Tape beginning sensor error.	Fast forwards tape to confirm. If tape beginning is detected again, ejects the cassette.	Check cassette and insert again if it is OK.
70 : 1 (AUTO OFF)	Drum rotation stopped.	Stops operation. Does not accept any operation.	Switch the power OFF and then switch it back ON. However, the tape may be damaged depending on the situation. So consult with the JVC authorized service agent.
71 : 1 (AUTO OFF)	Capstan rotation stopped.	Stops operation. Does not accept any operation.	
72 : 1 to 72 : 5 (AUTO OFF)	Supply reel rotation error.	Stops operation. Does not accept any operation.	
72 : 7	Supply reel rotation error due to tightly wound tape.	Ejects cassette.	Check cassette and insert again if it is OK.
73 : 1 to 73 : 4 (AUTO OFF)	Take up reel rotation error.	Stops operation. Does not accept any operation.	Switch the power OFF and then switch it back ON. However, the tape may be damaged depending on the situation. So consult with the JVC authorized service agent.
73 : 7	Take up reel rotation error due to tightly wound tape.	Ejects cassette.	Check cassette and insert again if it is OK.

12. OTHERS

12-2 Trouble Shooting (Cont'd)

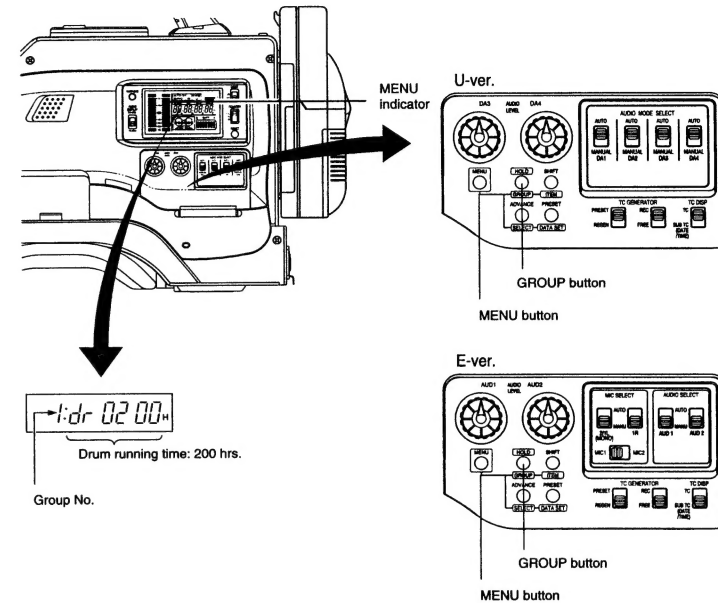
TROUBLES WITHOUT ERROR CODE OUTPUTS

Symptoms	Check points
Power cannot be switched ON.	<ul style="list-style-type: none"> Is power supply connected properly? Is battery pack recharged? When the lithium battery is depleted, the power should not be turned on.
Recording is not possible.	<ul style="list-style-type: none"> Is REC switch of cassette set it to ON? If it is OFF, set to ON.
Cassette is ejected.	<ul style="list-style-type: none"> Is the cassette in use a DIGITAL S cassette? VHS or S-VHS cassettes are ejected whenever they are inserted.
Noise interferes with playback video.	<ul style="list-style-type: none"> Video head may be clogged with dirt. Clean head with the special head cleaning tape. See page 7.
Time code or date/ time data are not displayed on the monitor screen.	<ul style="list-style-type: none"> Time code and date/time data are not displayed on the monitor screen during recording or playback of VCR. The data is shown only on the counter display.
Time code and user's bit data are not displayed on the counter.	<ul style="list-style-type: none"> Is TC DISP switch under the side panel cover set to SUB TC? If it is, set the switch to TC.
Remaining battery power display is incorrect.	<ul style="list-style-type: none"> The setup menu item "BATT. TYPE SELECT" may not be set correctly according to the type of battery in use. If the menu item setting is wrong, set it correctly by opening setup menu item "BATT. TYPE SELECT".
Battery alarm is displayed and VCR enters OPERATE OFF mode even when a fully charged battery is used.	
Cassette can not eject after the power is turned on.	<ul style="list-style-type: none"> The power supply unit's capacity may be insufficient. Check the power voltage. If the power is turned off within 1 second of opening the cassette holder, the cassette holder may not close properly.
Viewfinder image looks dark or unclear.	<ul style="list-style-type: none"> Adjust the contrast control. Is the filter switch set to 5600K+ND? Is the iris closed? Is the shutter speed too fast? Is the viewfinder cable correctly connected?
Noise appears when playing back a tape recorded with another VCR.	<ul style="list-style-type: none"> When the tape recorded on another VCR is played back or used for recording, this phenomenon may occur caused by the tracking shift.
The scene change section is disordered when a tape recorded with another VCR is used.	
VCR section does not operate after loading the cassette.	<ul style="list-style-type: none"> Does the cassette indication (C) in the display light? When the cassette indication is not lit, the cassette cover is in the half-lock condition. Push the cassette cover to the end to securely lock the cassette.
MIC1 or MIC2 sound is not input. (E-ver. only)	<ul style="list-style-type: none"> Using the [MIC1+MIC2] microphone select switch, select the mic input to be used.
A recording check is not possible with the viewfinder or monitor in the record-pause mode.	<ul style="list-style-type: none"> Is the [CAM/VTR] switch set to the CAM position? If so, set it to the VTR position.
Playback image is not output.	

12. OTHERS

12-3 Hour Meter Display

The unit can display the running time of the drum as the hour meter data on the counter display. The hour meter can be displayed by selecting setup menu Group 1.



1. Turn the POWER switch to ON.
2. Press the MENU button to enter the setup menu mode. The MENU indicator lights on the display and the setup menu is shown on the counter display.
3. Press the GROUP button to display setup menu Group 1. The drum operating hour data is shown on the counter display.
4. Press the MENU button to return to the normal mode.

→ See page 1-12 "1.9.1 Structure of DIAG mode".

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12-5 Specifications

• CAMERA SECTION

Image pickup device	: 2/3-inch interline CCDs
Color separation optical system	: 3-color separation prism
Number of effective pixels	: 380,000 pixels (768 (H) × 493 (V)) : U-ver. 440,000 pixels (754 (H) × 581 (V)) : E-ver.
Color system	: NTSC (R-Y, B-Y encoder) : U-ver. PAL (R-Y, B-Y encoder) : E-ver.
Color bars	: SMPTE color bar : U-ver. EBU colour bar : E-ver.
Sync system	: Internal sync External sync (VBS or BB)
Lens mount	: Bayonet system (FB 48.0 mm, 2/3" CCD cameras)
Optical filter	: 3200 K, 5600 K, 5600 K + 1/16ND, 3200 K + Effect (cross) filter : U-ver. 3200 K, 5600 K, 5600 K + 1/4ND, 5600 K + 1/16ND : E-ver.
Sensitivity	: F11, 2000 lx
Gain	: -3, 0, 6, 9, 12, 18 dB, LOLUX, ALC
Minimum illumination	: 4 lx with F1.4, +18 dB gain
Lolux minimum illumination	: 0.75 lx with F1.4
Registration	: 0.05% or less (excluding lens distortion)
Contour correction	: Horizontal dual-edged, Vertical 2 H
Shutter speed	: 100 (U-ver.), 120 (E-ver.), 250, 500, 1000, 2000 Hz
V.SCAN speed	: 60.5 Hz to 1966.7 Hz : U-ver. 50.4 Hz to 1953.1 Hz : E-ver.

• VCR SECTION

Format	: DIGITAL S
Tape width	: 12.65 mm
Tape speed	: 57.737 mm/sec : U-ver. 57.795 mm/sec : E-ver.
Record/Play time	: 104 minutes (With a DS-104 cassette)
F.F./rewind time	: Approx. 4 minutes (With a DS-64)

[VIDEO]

Frequency response	: Y : 0 to 5.0 MHz R-Y/B-Y : 0 to 2.0 MHz
Sampling frequencies	: Y : 13.5 MHz R-Y/B-Y : 6.75 MHz
Quantization	: 8-bit
S/N	: More than 52 dB (during BR-D80/D50 reproduction with component output)

[AUDIO]

Number of channels for recording	: PCM × 4, cue track × 2
Sampling frequency	: 48 kHz
Quantization	: 16-bit
Frequency response	: 20 Hz to 20 kHz (PCM)
Dynamic range	: More than 85 dB (PCM) (during BR-D80/D50 reproduction)
Wow & flutter	: Below measurable limit

[Time Code System]

Time code signal	: Compliance with SMPTE standard : U-ver. Compliance with EBU standard : E-ver.
LTC input	: 0 ± 6dBs, high impedance, unbalanced
LTC output	: 0 ± 6dBs, low impedance, unbalanced

• INPUT/OUTPUT SIGNALS

Video signal output	: 1 V (p-p), 75 Ω (BNC) (Composite video signal)
Lens	: 12-pin connector
DA4 (MIC 1) input	: -52 dBs, unbalanced, 6-pin
DA2 (MIC) input	: -60 dBs, balanced, +48 V XLR-3-pin
DA1/DA3 input	: +4 dBs/10 kΩ (select the switch) -60 dBs/3 kΩ (select the switch) +48 V (ON/OFF switch) (XLR3), balanced
Audio output	: 0 dBs, low impedance, (XLR5), balanced
Earphone output	: -60 to -17 dBs, at 8 Ω load
DC input	: 12 VDC ± (11 to 15 VDC ±)
Auxiliary power output	: 12 VDC ± : max. 0.1 A (11 to 15 VDC ±)

• GENERAL

Power consumption	: 34W with VF-P116 (Max) 30W with VF-P115 or VF-P116 (when recording) : U-ver. 12VDC ± 2.8A with VF-P116 (Max) 12 VDC ± 2.45A with VF-P115 or VF-P116 (when recording) : E-ver.
Mass	: Approx. 6.9 kg [with VF-P115, A18 × 9B12, Flat shape type lithium ion battery, accessory Microphone]
Operating temperatures	: 0 °C to 40 °C
Operating humidity	: 30 % to 80 % RH
Storage temperatures	: -20 °C to 60 °C

• ACCESSORIES

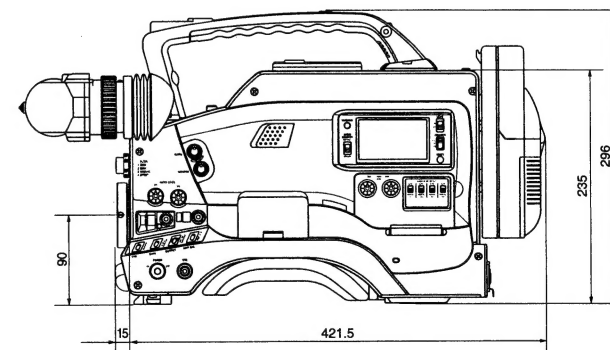
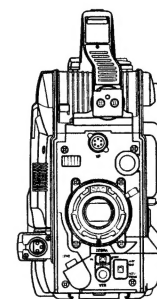
Microphone (Monaural)	: × 1
Tripod base	: × 1
Set up box	: × 1
Lithium battery	: × 1 (CR2032)
Instructions	: × 1

12-5 Specifications (Cont'd)

OPTIONAL ACCESSORIES

Viewfinder	: VF-P115, VF-P116
Power zoom lens	: A18 × 9B12, YJ18 × 9BK12
AC power adapter	: AA-P250, AA-G10
DC battery pack	: NB-G1 (12 V, 2.2 AH)
Microphone	: MV-P615, MV-P616, MV-P612
Mic holder	: KA-A90

EXTERNAL DIMENSIONS (unit : mm)



Design and specifications are subject to change without notice.